# EFFECT OF WARM COMPRESS APPLICATION USING OPTIC CARE WEAR VERSUS CONVENTIONAL METHOD ON THE LEVEL OF SYMPTOM COMPLEX AMONG ELDERLY CLIENTS WITH DRY EYE SYNDROME

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# CHAPTER I
# INTRODUCTION

## 1.1 Background of the Study

Old age is an inevitable phase of the human life cycle, encompassing significant physiological and psychological changes. Individuals progress through three distinct phases: childhood, middle age, and old age. Every person experience old age, as it is a natural part of the human lifecycle. This phase brings about profound transformations in both the body and mind. The terms "older adults," "elderly," or "geriatrics" refer to individuals who have reached or surpassed the average life expectancy. According to National Policy on Older Persons (1999), a person is considered a senior citizen or elderly if they are 60 years of age or older. (1) Advancements in healthcare have led to a steady increase in the global population of elderly individuals. The National Policy on Senior Citizens (2011) of India projected a staggering 326% growth in the population of individuals aged 60 years or above, and a remarkable 700% growth in the population of individuals aged 80 years or above between 2000 and 2050. The policy also indicates that $1/8^{th}$ of the Worlds Elderly Population lives in India. (2) Furthermore, it is estimated that by 2050, there will be two elderly people for every child. The percentage of elderly individuals in the world population is expected to increase rapidly from 9.5% in 1995 to 20.7% in 2050 and 30.5% in 2150. This phenomenon, known as "population ageing," poses both triumphs and challenges to society. (3) Population ageing has profound social, economic, and political implications for a country. With old age a multitude of ailments and diseases, necessitating the need for increased health services and additional medical resources. In India, there is a demand for an expansion of healthcare services, as well as additional medical facilities and resources, to adequately cater to the needs of over 76.6 million individuals aged 60 and above. This population segment constitutes more than 7.7% of the total population. (4)

Normal ageing involves inevitable and irreversible changes, contributing to the increased susceptibility of the elderly population to various health-related issues. Common problems experienced by older adults include sleep disorders, difficulties with eating or feeding, incontinence, dry eye disease, confusion, depression, evidence of falls, and skin breakdown. (5) Dry eye is a prevalent yet often underdiagnosed ocular disorder that imposes significant challenges. It not only causes troublesome symptoms but also places a substantial financial burden on affected individuals. Dry Eye Syndrome (DES) is a chronic multifactorial condition of the ocular surface, characterized by insufficient production of high-quality tears to adequately moisturize the eyes. DES can be classified into two main types: "dry eye with

reduced tear production" (aqueous deficiency) and "dry eye with increased evaporation of the tear film" (hyper evaporative type). DES can have a significant impact on vision and overall quality of life, as its symptoms frequently disrupt daily activities such as reading, writing, or working on video display gadgets. Prevalence rates of DES range from 5% to 50%, with higher rates observed among adults over the age of 40. In particular, women are more commonly affected by this condition. A study indicated that approximately 6.8% of the adult population in the United States had been diagnosed with DES. (6) In Jordan, a study revealed that 59% of the subjects exhibited an Ocular Surface Disease Index (OSDI) score of ≥20, which is considered a cut-off score indicating mild DES symptoms. (7) The prevalence of DES is significantly influenced by various factors such as geographic location, climatic conditions, and lifestyle of the population. Interestingly, Gupta, Prasad, Jain, and D'Souza (8) found that occupation had no significant effect on the risk of dry eye syndrome. Studies have reported a wide range of prevalence rates for DED, varying from 5% to 35%. (9) Elderly individuals are particularly vulnerable to DES due to age-related changes in tear production and composition. The symptom complex of DES includes ocular discomfort, dryness, burning sensation, foreign body sensation, and visual disturbances, significantly impacting the quality of life for affected individuals. Effective management of DES symptoms is crucial to alleviate discomfort and maintaining optimal ocular health in the elderly population.

**1.2 Need for the Study**

DES is a prevalent ocular disorder that affects a significant portion of the population, with varying prevalence rates reported across different regions. The condition not only causes discomfort and inconvenience to individuals but also poses a substantial burden on healthcare systems due to the associated healthcare costs. The elderly population, in particularis more susceptible to DES due to age-related changes in tear production and composition. (4) Treatments aimed at relieving symptoms of DES include various approaches such as tear replacement, humidification, optimizing nutrition, and the use of anti-inflammatory ocular agents. These interventions are intended to alleviate the discomfort experienced by individuals with DES and improve the overall health of the ocular surface. By addressing tear deficiency, promoting adequate moisture, ensuring proper nutrition, and reducing ocular inflammation, these treatments aim to enhance tear film stability and relieve symptoms associated with DES. Given the potential negative impact of dry eye, there is a crucial need to comprehend the underlying factors contributing to its development. (3) The etiology of dry eye can be complex and multifactorial, as it is influenced by various intrinsic and extrinsic risk factors. Intrinsic factors associated with an increased risk of DES include advancing age, female gender, pre-

existing ocular conditions, and certain systemic and autoimmune diseases. On the other hand, extrinsic risk factors for DES encompass external elements such as contact lens usage, environmental conditions like low humidity or exposure to air currents affecting the eye, topical or systemic medications, inadequate hygienic practices for eyelids and eyelashes, eye beauty trends, and the ingredients and application of eye cosmetic products. The study conducted by Manaviat Rashidi, Afkhami-Ardekani, and Shoja (10) revealed a higher prevalence of DES among diabetic patients with diabetic retinopathy ($p = 0.02$). Additionally, the study identified significant associations between DES and other factors such as age, gender, and duration of diabetes. Understanding these risk factors is crucial in identifying individuals who are more susceptible to developing dry eye and implementing appropriate preventive and management strategies to alleviate the symptoms and improve the quality of life for affected individuals. Given the potential negative impact of dry eye, there is a crucial need to comprehend the underlying factors contributing to its development.

According to a study (11), the prevalence and impact of DES are experiencing a substantial and rapid increase, highlighting the urgent demand for novel therapeutic approaches. The growing burden of DES underscores the necessity for innovative interventions to address the rising number of individuals affected by this condition. As the prevalence of DES continues to escalate, it becomes imperative to explore and develop new treatment modalities that can effectively manage the symptoms and improve the overall well-being of individuals living with this ocular disorder. Most topical medications are to address the deficiency of growth factors and reduce inflammation on the ocular surface. These medications aim to restore the balance of essential components necessary for maintaining a healthy tear film. Additionally, a significant focus in recent developments revolves around devices and procedures targeting meibomian gland dysfunction, a common underlying cause of dry eye. These approaches aim to improve the function of meibomian glands and promote the secretion of high-quality tears. Notably, one novel device (11) utilizes the nasolacrimal reflex pathway to stimulate tear production, offering a promising avenue for managing dry eye symptoms. Another study (12) investigated the efficacy of a warm compress containing menthol as a potential treatment for dry eyes. The findings of this study suggest that the repeated application of a warm compress containing menthol holds promise as a novel therapeutic approach for DES. The menthol-infused warm compress demonstrated positive effects in relieving DES and improving tear film stability. Olson, Korb, and Greiner's (13) study findings provide evidence supporting the use of warm compress therapy as an effective intervention for DES management. However, further research and clinical trials are warranted to validate these

findings and explore the mechanisms underlying the therapeutic benefits of warm compress in treating dry eyes.

Even though the literature indicates the effectiveness of warm compress for the treatment of DES, there is a recognized need for an effective apparatus specifically designed for this purpose. Conventional warm compress approaches often rely on using warm water-soaked washcloths or cotton pads to gently warm the eyelids and stimulate the secretion of oils from the meibomian glands. However, this method presents several challenges that need to be addressed. One of the challenges is achieving and maintaining the optimal temperature for the warm soak. It can be difficult to consistently maintain the desired temperature throughout the treatment, which can potentially affect its effectiveness in relieving DES symptoms. Another challenge is the messiness associated with using water-soaked washcloths. The need for access to warm water and a suitable container for soaking the cloth or pads can be inconvenient during the procedure, particularly when individuals are on the go or lack access to appropriate facilities. Moreover, warm soaks typically require a longer duration of application to effectively warm the eyelids and stimulate the meibomian glands. This time-consuming aspect may be impractical for individuals with busy schedules. Additionally, ensuring proper hygiene and cleanliness of the washcloth or cotton pads used for warm soaks is crucial. Failure to maintain hygiene standards can potentially introduce bacteria or irritants to the eyes, leading to further complications. Considering these challenges, there is a growing need for the development of clinical apparatus specifically designed for the warm compress treatment of DES. Such apparatus should provide an optimum level of warmth at a controllable temperature and offer an easy-to-use form factor. This would enhance the convenience, effectiveness, and hygiene of the warm compress treatment, ultimately improving the overall management of DES.

Along with the design and development of the device, it is crucial to assess the clinical effectiveness of the device in reducing DES symptoms. This would involve conducting rigorous clinical studies to evaluate the device's impact on various aspects of DES, such as tear production, ocular surface inflammation, and overall symptom improvement. Additionally, comparative studies can be conducted to compare the effectiveness of the device with existing conventional methods, providing valuable insights into its potential advantages and limitations. By measuring the clinical effectiveness of the device, healthcare professionals and researchers can gather evidence-based data to support its adoption as a reliable and efficient treatment option for DES. This will not only contribute to the advancement of DES management but also enhance patient outcomes and quality of life.

### 1.3 Statement of the Problem

A study to assess the effect of warm compress application using Optic Care Wear versus the conventional method on the level of symptom complex among elderly clients with Dry Eye Syndrome residing in selected old age homes in Puducherry.

### 1.4 Purpose of the Study

The study aims to identify the symptom complex among elderly clients with Dry Eye Syndrome. Additionally, it seeks to compare the effectiveness of warm compress application using Optic Care Wear versus the conventional method in reducing the level of symptom complex among elderly clients with Dry Eye Syndrome.

### 1.5 Objectives of the Study

The objectives of the study were

Phase 1

- To screen the symptoms of complex and dry eye among the elderly in group 1 and group 2 residing in old age homes.

Phase 2

- To evaluate the effectiveness of the Warm compress application using optic care wear on the level of Symptom Complex among the elderly in group 1.
- To evaluate the effectiveness of Warm compress application using the conventional method on the level of Symptom Complex among the elderly in group 2.
- To compare the effectiveness of the warm compress application using optic care wear versus the Conventional method on the level of Symptom Complex among group 1 and group 2.
- To correlate between Warm compress application using optic care wear versus Conventional method on the level of Symptom Complex among two groups
- To associate the level of Dry eye syndrome among clients with selected demographic and clinical variables.

### 1.6 Hypotheses

All hypotheses were tested at a 0.05 level of significance

**$H_1$**: The level of Symptom complex differs among elderly clients with dry eye syndrome before and after administration of warm compress using optic care wear.

**$H_2$**: Correlation exists between the effects of warm compress provided with optic care wear and conventional method on the level of symptom complex among elderly clients with dry eye syndrome.

**$H_3$**: Association exists between levels of symptom complex among clients with dry eye syndrome with selected demographic and clinical variables

### 1.7 Study Variables

The study includes the following variables:

- **Independent Variable** - Warm Compress applications using optic care wear and conventional method
- **Dependent Variable** - Level of the symptom complex experienced by the clients

### 1.8 Definition of the Terms

- **Assess***: Measuring the level of symptom complex using the OSDI (Ocular Surface Disease Index), TBUT (Tear Break-up Time), and Schirmer's Test.*
- **Effectiveness**: *Reduction of symptoms observed after warm compression among elderly clients, measured using the OSDI (Ocular Surface Disease Index), TBUT (Tear Break-up Time), and Schirmer's Test.*
- **Warm Compression**: *The application of warm compression at 45° C, applied over the closed eyelid for 10 minutes. This is done twice daily for 3 weeks.*
- **Optic Care Wear**: *A wearable piece in the shape of an eye-shaped rubber pouch used for warm compress application. It is filled with hot water at 45° C and applied over the closed eyelid for 10 minutes. This is done twice daily for 3 weeks.*
- **Conventional Method**: *The conventional method involves a clean cotton covered with gauze cloth dipped into hot water at 45° C, squeezed, folded, and intermittently applied over the closed eyelids for 10 minutes for 3 weeks*
- **Dry Eye**: *A condition characterized by decreased tear level, measured using the OSDI (Ocular Surface Disease Index), TBUT (Tear Break-up Time), and Schirmer's Test.*
- **Symptom Complex**: *Includes sensitivity to light, blurred vision, gritty or scratchy sensation, burning or stinging, tearing or watering, pain or burning, ocular fatigue, and dryness.*
- **Elderly Clients:** *Clients between the ages of - 60 years of age and above with dry eye who reside in old-age homes.*

### 1.9 Assumptions

- Clients with Dry eye syndrome are likely to experience a symptom complex that includes sensitivity to light, blurred vision, gritty or scratchy sensation, burning or stinging, tearing or watering, pain or discomfort, ocular fatigue, and dryness.
- The application of warm compress therapy has a positive effect on managing the symptom complex associated with Dry eye syndrome.
- Group 1 receiving a warm compress using optic care wear will demonstrate significant benefits compared to Group 2 receiving the conventional method.
- Improvement in dry eye syndrome among the elderly will enhance their quality of life.
- Elderly clients possess a certain level of awareness regarding dry eye syndrome and its impact.

### 1.10 Delimitation

The study was delimited in the following ways:

- The study exclusively included elderly clients who had been diagnosed with dry eye.
- The primary participants of the study were limited to elderly clients residing in old age homes.
- The data collection period for this study was one year

### 1.11 Summary

This chapter introduces the research study, covering the background and rationale for conducting the study. The chapter presents the need for the study, the statement of the problem, and the objectives. Additionally, it discusses the assumptions, hypotheses, and definitions of key terms used throughout the study.

# CHAPTER II

# REVIEW OF LITERATURE

The literature review serves as a crucial component of the research process, encompassing multiple facets to evaluate available data within the context of existing knowledge. Its primary objective is to retrieve and analyze existing evidence related to the problem under investigation, establishing the necessity for the new study. A research literature review entails a written summary that encompasses the current state of evidence regarding the research problem. For the present study, an extensive survey of published studies related to DES and its prevalence, as well as treatment approaches, was conducted. Scholarly journals, conference proceedings, and books available in databases such as Web of Science (WOS), PubMed-Medline, and

Scopus were utilized to identify relevant literature. These sources provide valuable insights into the selected problem for this study. The literature review is presented in both narrative and systematic review formats, with the available literature organized and presented under the following subheadings:

**2.1 Overview of DES**

Dry Eye Syndrome (DES) is a multifactorial ocular condition characterized by inadequate tear film quality and quantity, resulting in discomfort and visual disturbances. (14) It results in damage to the ocular surface accompanied by increased osmolarity of the tear film and inflammation of the ocular surface. (15) According to (16), DES is influenced by various personal, environmental, chronic illnesses, autoimmune diseases, and injury-related risk factors. Personal factors such as advanced age, ethnicity, and low dietary intake of omega-3 fatty acids contribute to the development of DES. Environmental factors such as low humidity, air-conditioning, and prolonged exposure to digital screens also play a role. Chronic illnesses like diabetes, depression, and thyroid disease, as well as autoimmune diseases such as rheumatoid arthritis, can increase the risk of DES. Common symptoms of DES include a stinging or burning sensation, sensitivity to light, redness, the feeling of something in the eyes, difficulty wearing contact lenses, blurred vision, and watery eyes as a response to irritation. DES can be due to a combination of inadequate tear production and excessive tear evaporation, leading to hyperosmolarity, inflammation, and tissue damage. This makes the tear film unstable resulting in early tear breakup and worsening hyperosmolarity. DES can be classified into two categories: aqueous-deficient dry eye, associated with reduced lacrimal secretions, and evaporative dry eye, often caused by meibomian gland dysfunction (MGD) and other factors affecting the eyelids and ocular surface. Treatment for dry eyes typically involves using non-prescription eye drops (artificial tears) for mild symptoms. For persistent and severe symptoms, treatment options aim to address the underlying cause, improve tear quality, or prevent rapid tear drainage from the eyes.

**2.2 Studies Related to the Prevalence of DES**

The cross-sectional study (17) compares the prevalence of symptomatic dry eye (DE) and identifies risk factors for dry eye in Thailand. Data was collected from a smartphone app called "Dry eye or not?" and included demographic information, Ocular Surface Disease Index (OSDI) score, blink rate, maximum blink interval (MBI), best spectacle-corrected visual acuity (BSCVA), visual display terminal (VDT) use data. The prevalence of symptomatic dry eye among app users in Thailand was found to be 85.8%, with the highest prevalence in the

northeastern and Northern regions. Factors associated with symptomatic dry eye included worse BSCVA, increased blink rate, reduced MBI, female sex, more than 6 hours of VDT use, and lower education level.

Albdaya et al. (18) conducted a study focused on adult Saudi females who use eye cosmetics and aimed to assess the prevalence of DES and its association with cosmetic usage. A total of 207 responses were analyzed, revealing a high prevalence of DES among cosmetic users (71.6%). Mascara was found to be the most commonly used cosmetic product. The frequency of using inner eyeliner was significantly associated with a higher prevalence of DES, while no correlation was observed for mascara or external eyeliner usage. The findings highlight the increased risk of DES among women using eye cosmetics and emphasize the importance of proper cosmetic removal practices.

Another cross-sectional study (19) determines the prevalence of symptoms of dry eye in an urban population in India. A total of 2,378 participants aged 20 years and above were included in the study, and DES symptoms were assessed using a validated questionnaire. The crude and overall age-adjusted prevalence for any positive symptom was 6.5% and 6.8% (95% CI: 5.8–7.8%), respectively, with red eyes (2.8%) being the most common symptom. Risk factors associated with DES symptoms included female sex, use of digital displays, smoking, and staying in air-conditioned environments. The prevalence of DES symptoms in the urban Indian population was lower than reported in most other studies outside India, suggesting a possible non-uniform distribution of DES in the country.

The observational hospital-based study (20) in India examined the incidence, demographics, types, and risk factors of dry eye among new patients. Out of 1,458,830 patients, 21,290 (1.46%) were diagnosed with recent-onset DES, with a higher incidence in adults than children. The study identified age, sex, residence, occupation, and socio-economic status as significant risk factors for DES development. Evaporative, aqueous deficient, and mixed types of DES were observed in varying proportions. Given India's emerging economy, urbanization, and ageing population, the study emphasizes the need for increased awareness and management strategies to address the potential DES epidemic in the country.

### 2.3 Studies Related to the Conventional Method of Warm Compress for DES

A study (21) assesses the effect of warm compress therapy using hard-boiled eggs as a heat source on corneal shape. Twenty-five participants underwent different treatment protocols, including gentle contact with a hot hard-boiled egg covered with a wet cloth on the eyelid, placing the hot egg close to the eyelid without touching it, and using a cold egg on the eyelid.

Skin temperature and corneal parameters were measured before and after each treatment. The results showed that placing the egg close to the eyelid without touching resulted in a significant skin temperature rise without affecting corneal parameters, suggesting that this method can effectively melt meibomian gland secretions during warm compress therapy without distorting the corneal shape.

Madumalini et al. (22) conducted a quasi-experimental study to evaluate the effectiveness of warm compress therapy on lacrimation and associated symptoms of dry eye in elderly clients in Chandigarh. The findings demonstrated that warm compress treatment, whether using a warm washcloth or Lindy's rice baggy, provided relief from dry eye symptoms and increased tear levels in both eyes. The therapy reduced excessive tear evaporation and enhanced tear secretion by addressing the oily substances in the meibomian glands. The study recommended applying warm compresses twice a day, and statistical analysis indicated a significant reduction in dry eye levels in the experimental group compared to the control group.

Another study (23) examines the effect of warm, moist compress therapy on tear-film lipid layer thickness (TFLLT) in patients with meibomian gland dysfunction (MGD). Twenty patients with MGD were treated with a warm compress on one eye and a room-temperature compress on the other eye for 30 minutes. TFLLT measurements were taken at various time points during and after the treatment. The results showed a significant increase in TFLLT in the eye treated with the warm compress compared to baseline measurements, with an 80% increase after 5 minutes of treatment and an additional 20% increase after 15 minutes. In contrast, there was no significant change in TFLLT in the control eye treated with the room-temperature compress. These findings support the use of warm, moist compress therapy as an effective treatment for MGD by increasing TFLLT and improving tear film stability.

According to Blackie et al. (24), heating the warm compress to around 45°C was recommended for optimal application, as it maximizes heat in the meibomian glands and improves therapeutic outcomes. The study suggests that maintaining a higher temperature during warm compress therapy can enhance its effectiveness in managing conditions like meibomian gland dysfunction and dry eye.

### 2.4 Studies Related to Advancement in a Warm Compress for DES

The ESPOIR (Evaluation of the Satisfaction of Patients with Management of Ocular Surface Diseases) study (25) aimed to evaluate the safety and efficacy of the Blephasteam® eyelid warming device in patients with Meibomian gland dysfunction (MGD). A total of 102 symptomatic patients underwent two daily sessions with the device, recording diary entries on

various parameters. At the end of the study, significant improvements were observed in symptomatology, hyperemia score, quality of meibum, and overall symptomatology as assessed by the patients. Clear vision and blinking were not affected, and patients reported satisfaction with the treatment. No adverse events were reported, and safety was rated positively by investigators. The study concludes that the eyelid warming device is safe and effective in reducing ocular discomfort and symptoms in MGD.

A meta-analysis (26) was conducted to compare the effectiveness of intense pulsed light (IPL) therapy and conventional treatments in meibomian gland dysfunction (MGD)-related dry eye disease (DED). Eleven randomized controlled trials (RCTs) were included in the analysis. The results showed that IPL therapy was associated with significant improvements in Ocular Surface Disease Index (OSDI) scores and Standard Patient Evaluation of Eye Dryness (SPEED) scores compared to conventional therapies. Additionally, IPL therapy resulted in increased tear break-up time (BUT) and non-invasively measured tear break-up time (NIBUT). However, there was no significant difference in corneal and conjunctival fluorescein staining (CFS) scores between the two groups. Overall, both IPL treatment and traditional treatments were effective in treating MGD-related DED, but IPL therapy showed superiority in certain aspects.

The prospective, multicenter clinical trial (27) aimed to evaluate the long-term efficacy of a single 12-minute Vectored Thermal Pulsation (VTP) treatment in improving meibomian gland function and dry eye symptoms in patients with meibomian gland dysfunction and evaporative dry eye. The study included 200 subjects who were randomized to receive either the VTP treatment or conventional warm compress and eyelid hygiene therapy for 3 months. The results showed that at 3 months, the treatment group had significantly greater improvements in meibomian gland secretion and dry eye symptoms compared to the control group. At 12 months, 86% of the treatment group and 89% of the crossover group had received only one VTP treatment and sustained significant improvements in meibomian gland function and dry eye symptoms. The study concluded that a single VTP treatment can provide sustained improvements in meibomian gland function and reduce dry eye symptoms over 12 months, and it is more effective than conventional therapy. Early intervention with VTP for meibomian gland dysfunction is associated with better treatment outcomes.

Another study (28) evaluates the role of a noninvasive ocular surface analyzer (OSA) in diagnosing meibomian gland dysfunction (MGD) and determining the prevalence of MGD in a hospital setting. The study included 113 participants who underwent a comprehensive ocular

examination and assessment using the OSA. The prevalence of total MGD was found to be 57.52%, with symptomatic MGD accounting for 42.5% of cases. The prevalence was higher in individuals aged 50 years and above. Computer vision syndrome was identified as a risk factor for symptomatic MGD. The OSA measurements, including lipid layer thickness (LLT), noninvasive tear breakup time (NIBUT), tear meniscus height (TMH), and meibomian gland loss (MGL), showed significant differences between MGD and non-MGD groups. MGL demonstrated the highest diagnostic accuracy for MGD. Overall, the study highlights the importance of incorporating noninvasive OSA in clinical practice for the rapid and reliable assessment of MGD-related parameters and emphasizes the high prevalence of MGD among adults in a hospital setting.

## 2.5 Research Gap

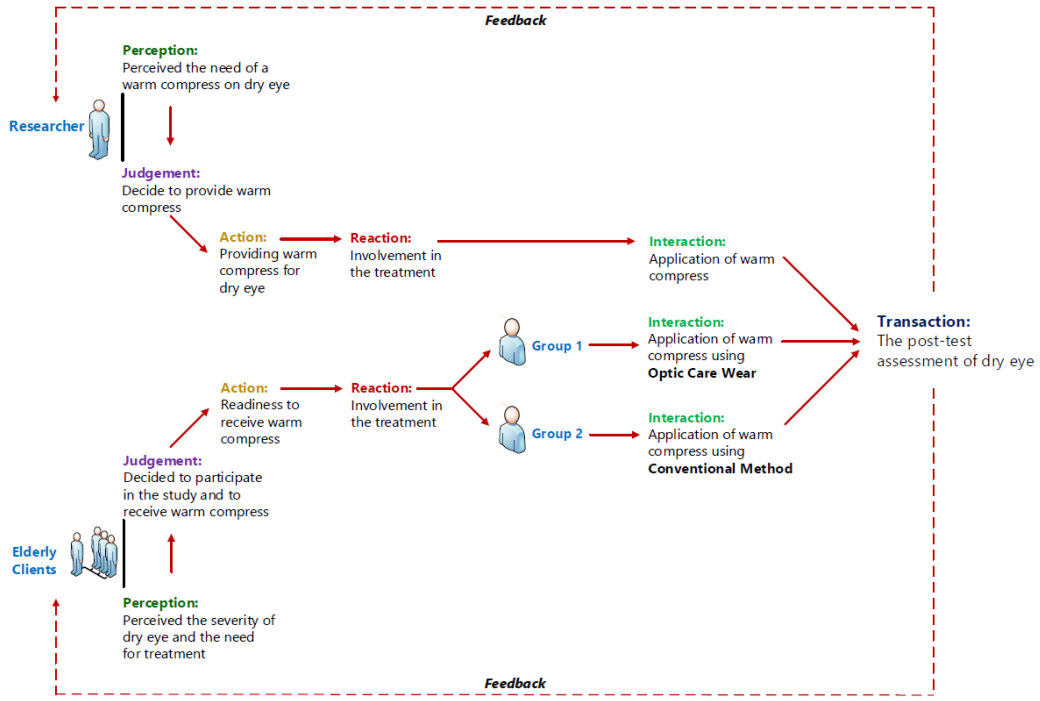
Based on the literature review, one literature gap is the lack of long-term studies evaluating the sustained effectiveness of warm compress therapy and other interventions for dry eye associated with meibomian gland dysfunction. While several studies have demonstrated short-term improvements in meibomian gland function and dry eye symptoms, there is a need for more extensive research examining the long-term outcomes of these interventions. Additionally, further investigation into the optimal frequency, duration, and specific techniques of warm compress therapy could help standardize its application and enhance its efficacy.

Additionally, there is a need for clinical trials evaluating the use of devices for warm compress therapy in treating dry eyes, specifically focusing on devices that can maintain an optimum temperature throughout the treatment. While traditional warm compress methods, such as warm washcloths, are commonly used, they may not consistently maintain the desired temperature over time. Investigating the efficacy of specialized devices designed to provide controlled and sustained heat could help optimize the therapeutic benefits of warm compress therapy. Clinical trials comparing different methods and assessing their long-term effectiveness, safety, and patient satisfaction would contribute to filling this research gap and provide valuable insights for improving the management of dry eye associated with meibomian gland dysfunction. Addressing these literature gaps would contribute to a more comprehensive understanding of the long-term effectiveness and optimal utilization of warm compress therapy for dry eye management.

## 2.6 Conceptual Framework

Imogene King's Goal Attainment Theory (1981) is a nursing theory that emphasizes the importance of goal setting and the interaction between individuals and their environment.

According to this theory, individuals strive to achieve their personal goals, and their ability to attain these goals is influenced by their perceptions, judgments, communication, and interactions with others. In the context of this study, the researcher adopted King's Goal Attainment Theory as a theoretical framework to examine the effectiveness of warm compress in reducing dry eye symptoms in elderly clients. The theory provides a comprehensive framework to understand the interactions and transactions between the researcher and the elderly clients residing in old age homes. The theory suggests that effective goal attainment requires effective communication and interaction between the researcher and the clients. The conceptual framework, developed based on Imogene King's Goal Attainment Theory (1981), is depicted in Figure 1.




This framework outlines the interrelationships among seven key phenomena involved in the treatment of elderly clients with dry eye syndrome (DES).

- **Perception**: *The process of becoming aware and interpreting sensory information from the environment. In this study, perception refers to how elderly clients and the researcher perceive and interpret the dry eye symptoms and the effectiveness of the warm compress intervention.*
- **Judgment**: *The cognitive process of evaluating information, making decisions, and forming opinions or conclusions. In the study, the judgment refers to the elderly clients' and the researcher's cognitive assessment and evaluation of the warm compress intervention's effectiveness in reducing their dry eye symptoms.*

- **Action**: *The observable behaviour or response that individuals engage in as a result of their perception, judgment, or decision-making process. In this study, action refers to the specific behaviours and actions taken by elderly clients and the researcher, such as readiness for providing or receiving the warm compress technique, adhering to the intervention schedule, and practicing self-care for the treatment.*
- **Reaction**: *The response or feedback received from the elderly clients regarding the outcomes or effects of the warm compress intervention on their dry eye symptoms. The reaction includes the involvement of both researcher and the elderly clients in the treatment of dye eye.*
- **Interaction**: *The reciprocal communication and engagement between the researcher and the elderly clients in the context of the study. Interaction involves the exchange of information, discussions, and collaborative decision-making regarding the warm compress intervention, its implementation, and its impact on dry eye management. It also includes the subjective experiences, satisfaction levels, and any changes in their symptomatology after the application of warm compress in Group 1 and Group 2.*
- **Transaction**: *The dynamic and continuous process of interaction between the researcher and the elderly clients, where both parties contribute to and influence the outcomes. Transaction refers to the ongoing reciprocal changes on the symptom level measured through post-test to ensure effective implementation of the warm compress intervention and optimal goal attainment.*
- **Feedback**: *Information or responses provided by the elderly clients about their experiences, outcomes, and satisfaction with the warm compress intervention. Feedback in this study includes verbal or written reports, assessments of symptom improvement, and suggestions for further improvement or modifications to the intervention approach. It helps in evaluating the effectiveness of the intervention and making necessary adjustments.*

By adopting King's Goal Attainment Theory, the study recognizes the importance of understanding the clients' perceptions, judgments, and communication patterns in the context of their goal attainment. The theory provides a holistic framework to examine how the warm compress intervention, implemented through interactions between the researcher and the elderly clients, can contribute to the clients' goal achievement in managing dry eye symptoms.

### 2.7 Summary

In conclusion, the advancement in warm compress therapy for dry eye has shown promising results in improving meibomian gland dysfunction and alleviating associated symptoms. Studies have demonstrated that warm compress therapy applied to the closed eyelids increases tear-film lipid layer thickness, leading to enhanced meibum flow and improved tear stability. Furthermore, the introduction of medical devices such as Blephasteam® and the use of intense pulsed light (IPL) therapy has shown significant benefits in treating dry eye related to meibomian gland dysfunction. These advancements provide more standardized and effective approaches for managing dry eye symptoms, offering relief to patients and enhancing their quality of life. Continued research and advancements in this field hold great potential for further improving the treatment outcomes for individuals suffering from dry eye. Finally, a conceptual framework based on Imogene King's Goal Attainment Theory is presented, outlining the key phenomena involved in the study of treating elderly clients with dry eye syndrome (DES).

# CHAPTER III

# RESEARCH METHODOLOGY

This chapter outlines the research methodology employed to evaluate the impact of warm compress application using optic care wear versus the conventional method on the level of symptom complex among elderly clients with Dry Eye Syndrome. It encompasses the research design, setting, sample, sampling techniques, data collection instruments, the procedure of data collection, pilot study, and ethical considerations. The study methodology is structured and presented in two phases: Phase I and Phase II.

### 3.1 Research Approach

The research approach employed in this study is a quantitative evaluative approach. This approach focuses on using numerical data and statistical analysis to assess and evaluate the research objectives. Through the collection of quantifiable data, such as experimental measurements, this approach aims to measure the effectiveness of warm compress application using optic care wear in treating DES.

### 3.2 Research Design

The research design is the plan, structure, and strategy of investigation used to answer the research question. It serves as the overall blueprint or framework selected by the researcher to conduct the study. In this study, a **quasi-experimental research design** was employed.

| Groups | Measurement of dependent variable | Intervention | Measurement of dependent variables | Measurement of dependent variables | Measurement of dependent variables |
|---|---|---|---|---|---|
| | Pre-test | | Post-test I | Post-test II | Post-test III |
| Group 1 | O1 | X | O2 | O3 | O4 |
| Group 2 | O1 | Y | O2 | O3 | O4 |

- **O1 –** *Denotes the pre-assessment of Dry Eye Syndrome in Group 1 and Group 2.*
- **X –** *Denotes the implementation of warm compress application using optic care wear in Group 1.*
- **Y –** *Denotes the implementation of warm compress application using Conventional method in Group 2.*
- **O2 –** *Denotes the post-assessment of the level of Dry Eye Syndrome in Group 1 and Group 2 (1st week).*
- **O3 –** *Denotes the post-assessment of the level of Dry Eye Syndrome in Group 1 and Group 2 (2nd week).*
- **O4 –** *Denotes the post-assessment of the level of Dry Eye Syndrome in Group 1 and Group 2 (3rd week).*

### 3.3 Research Setting

The setting refers to the specific physical locations where the data collection for the research was conducted. The data collection took place at Hospice Convent (Cluny old age home) and Pondicherry Society for the Care of the Aged.

### 3.4 Population

The population in this research study consists of elderly clients residing in a selected old age home in Pondicherry. The population is defined as the entire group of individuals who meet the specific criteria set by the researcher. In this case, it refers to the aggregation of elderly clients in the selected old age home who are the focus of the study.

### 3.5 Sample, Sample Size, and Sampling Technique

The sample for this research study consists of elderly clients residing in a selected old age home who meet the eligibility criteria. The total sample size is 140, with Group 1 comprising 70 participants and Group 2 also comprising 70 participants. The sampling technique employed for participant selection is a combination of cluster sampling and simple random sampling techniques. Cluster sampling involves selecting entire groups (clusters) from the population, while simple random sampling is used to randomly select the elderly clients within each cluster.

This approach allows for a representative sample of elderly clients in the selected old age home to be included in the study.

| **Sample Size For Comparing Two Means** | |
|---|---|
| **Input Data** | |
| Confidence Interval (2-sided) | 95% |
| Power | 80% |
| Ratio of sample size (Group2/Group1) | 1 |

| | **Group 1** | **Group 2** | **Difference*** |
|---|---|---|---|
| Mean | 11.4 | 9.84 | 1.56 |
| Standard Deviation | 3.49 | 2.68 | |
| Variance | 12.1801 | 7.1824 | |

| | |
|---|---|
| Sample size of Group 1 | 70 |
| Sample size of Group 2 | 70 |
| Total sample size | 140 |

**Difference between the means*

### 3.6 Inclusion Criteria

- Client diagnosed with dry eye syndrome.
- Clients diagnosed with diabetes mellitus having Dry Eye Syndrome.
- Client who express willingness to participate in the study.
- Both male and female clients.
- Clients who are 60 years of age and above.

These criteria ensure that clients with dry eye syndrome, regardless of gender, who are willing to participate and fall within the specified age group, are included in the research study.

### 3.7 Exclusion Criteria

- Clients currently undergoing treatment for glaucoma.
- Clients who are already receiving treatment for dry eye syndrome.
- Clients who have undergone any recent eye surgery.
- Clients who are not available or unable to participate during the study period.
- Clients with tear levels less than 5mm.
- Clients who are concurrently receiving other interventions such as massages and eye exercises for their condition.

These criteria ensure that clients with specific circumstances or conditions that may interfere with the study outcomes or confound the results are excluded from the research sample.

### 3.8 Measures Taken to Avoid Bias

To avoid potential bias in the study, the participants and the statistician were kept unaware of which group they belonged to prevent bias in their responses or analysis. This approach, known as blinding or masking, helps ensure that the assessment and interpretation of outcomes remain objective. Additionally, during data collection and analysis, the groups were labeled as Group 1 and Group 2, further maintaining blinding to prevent bias from influencing the results. These measures are taken to avoid bias and enhance the reliability and validity of the study's findings by minimizing potential subjective influences on the outcomes.

### 3.9 Data Collection Instruments

The tool was developed and standardized through an extensive review of the literature and discussions with experts in the field. It was carefully designed to capture the relevant variables and measurements required for the study. The tool consists of two sections, each focusing on specific aspects of the research objectives. The development and standardization process ensured that the tool is reliable, valid, and capable of providing accurate data for the research study.

Section A of the research tool comprised two parts: Part 1 focused on demographic variables, while Part 2 captured clinical variables.

- **Part 1: Demographic Variables** - *This section collected information on age, sex, education, socio-economic status, type of family, religion, habits leisure activities, use of gadgets, contact lens, previous knowledge and source of information. . These variables were assessed using a structured interview schedule, ensuring systematic data collection and standardization.*
- **Part 2: Clinical Variables** - *This section included measurements of height, weight, temperature, pulse, respiration, blood pressureAdditionally, it gathered data on the participants' previous history of hospitalization for dry eye syndrome, the onset of illness, and co-morbidities. These clinical variables were recorded to provide a comprehensive understanding of the participant's health status and its association with dry eye syndrome.*

Section B of the research tool consisted of three measures to assess dry eye syndrome:

- **OSDI (Ocular Surface Disease Index)** - *This scale was used to evaluate the severity of dry eye symptoms experienced by the participants.*
- **TBUT (Tear Break-Up Time) -** *TBUT is a clinical test that measures the stability of the tear film.*
- **Schirmer's Test -** *Schirmer's test measures tear production to assess the quantity of tears produced by the lacrimal glands.*

These measures were employed to gather objective data on the participants' dry eye symptoms, tear film stability, and tear production, allowing for a comprehensive evaluation of their condition. The detailed tool descriptions are attached in the Appendix.

### 3.10 Calibration of the instruments

The instruments required for data collection, namely the Ophthalmoscope, Thermometers and Optic care wear (IPA-201941000236) were calibrated at Telematic & Biomedical Services and Raini Industries Pvt. Calibration ensures the accuracy and reliability of these instruments, allowing for precise measurements during the research study. By undergoing calibration, the instruments were verified to meet the required standards, ensuring the integrity of the collected data.

### 3.11 Content Validity

Validity is defined as the extent to which an instrument accurately measures what it intends to measure. In this study, the tool used for data collection was validated by a panel of experts from the Department of Ophthalmology, Department of Medicine, Department of Medical-Surgical Nursing and Department of Statistics These experts thoroughly examined the clarity, relevance, comprehensiveness, and appropriateness of the tool's content. Based on their valuable suggestions, the tool was refined and modified to ensure its validity. The incorporation of the experts' feedback and the subsequent finalization of the tool enhanced its accuracy and ensured that it effectively measured the intended variables.

### 3.12 Reliability

The reliability of a research instrument refers to its ability to consistently produce similar results when administered repeatedly. Following the validation process, the tool underwent a reliability test to assess its consistency. The reliability coefficient of the entire test was determined using the SPSS, specifically using Cronbach's alpha reliability. The obtained reliability coefficients were 0.89, 0.85, and 0.81 for the OSDI (Ocular Surface Disease Index)

Scale, Tear Break-Up Time (TBUT) Scale, and Schirmer test scoring scale, respectively. These high-reliability scores indicate that the tool demonstrated stability and consistency in measuring the intended variables. As a result, the tool was deemed highly reliable and were suitable for use in the main study.

### 3.13 Ethical Consideration

Ethical considerations play a crucial role in research to ensure the protection and well-being of the study subjects. In this study, ethical committee clearance was obtained, indicating that the research protocol was reviewed and approved by the relevant ethics committee. Written informed consent was obtained from each participant, ensuring their voluntary participation, and understanding of the study's purpose and objectives. The tool used in the study was validated for its content by field experts and guides, ensuring its reliability and relevance. Client were provided with a clear explanation of the study's purpose and objectives before their participation, promoting transparency. Confidentiality of the participants' information was assured, emphasizing that their personal data would be handled with utmost privacy. Moreover, measures were taken to ensure that the prescribed intervention would not disrupt the normal work schedule of the participants, minimizing any potential inconvenience. These ethical considerations were integral to maintaining the ethical integrity of the study and safeguarding the rights and welfare of the participants.

### 3.14 Pilot Study

A pilot study was conducted to ensure the feasibility and effectiveness of the research methodology before implementing the main study. Formal permission was obtained from the Institutional Ethical Committee to conduct the pilot study. The study took place in selected areas in Pondicherry for a period of 6 weeks. Using probability sampling techniques, specifically Cluster Sampling Technique, the sample was assigned. A total of 20 clients suffering from dry eye syndrome were divided into two groups: 10 clients in the group 1 and 10 clients in the group 2. Prior to data collection, the purpose of the study was explained to the participants, and both written informed consent and oral consent were obtained. Pre-tests were conducted using the OSDI (Ocular Surface Disease Index) Scale, Tear Break-Up Time (TBUT) scale, and Schirmer test scoring scale among the dry eye syndrome clients The intervention involved warm compress application using optic care wear - in group 1, while group 2 received a conventional warm compress. Post-tests were conducted for both groups using the same assessment tools. The findings from the pilot study will helped to refine the

research methodology and ensure its validity and reliability before proceeding with the main study.

### 3.15 Procedure for Data Collection

The data collection procedure involved several steps to gather relevant information from the participants affected by dry eye syndrome in selected areas of Puducherry. The purpose and objectives of the study were clearly explained to all the participants to ensure their understanding and cooperation. Demographic variables and clinical variables were collected using an interview schedule. Before the intervention, a pre-test assessment of dry eye syndrome was conducted for both group 1 and group 2 using the OSDI (Ocular Surface Disease Index) Scale, Tear Break-Up Time (TBUT) test, and Schirmer's Test. Group 1 received the intervention, which involved warm compress application using optic care wear. Group 2 received a conventional warm compress. The intervention was administered according to the assigned groups. During the intervention period, skin temperature was assessed using the contact Infrared Thermometer, and the warm compress application was carried out as per the prescribed protocol.

Post-test assessments, including Post-test 1, Post-test 2, and Post-test 3, were conducted at one-week intervals for both Group 1 and Group 2 over a three-week period using the same assessment tools. These assessments allowed for the evaluation of the participant's responses to the interventions and the measurement of any changes in their dry eye syndrome symptoms.

By following this data collection procedure, comprehensive data on the participants' dry eye syndrome symptoms and their response to the warm compress intervention using Optic care wear in group 1 and the conventional warm compress in group 2 were obtained.

### 3.16 Plan for Data Analysis

Data analysis is a crucial technique used to organize, reduce, and derive meaningful insights from collected data. In this study, the collected data were coded and analyzed using both descriptive and inferential statistics. The data analysis plan included the following methods:

Descriptive Statistics:

- Socio-demographic and clinical variables among clients with dry eye syndrome in both groups were analyzed using frequency and percentage distribution.
- Assessment of OSDI, Tear Break-Up Time (TBUT), and Schirmer test scoring among clients with dry eye syndrome in both groups were analyzed using frequency and percentage distribution.

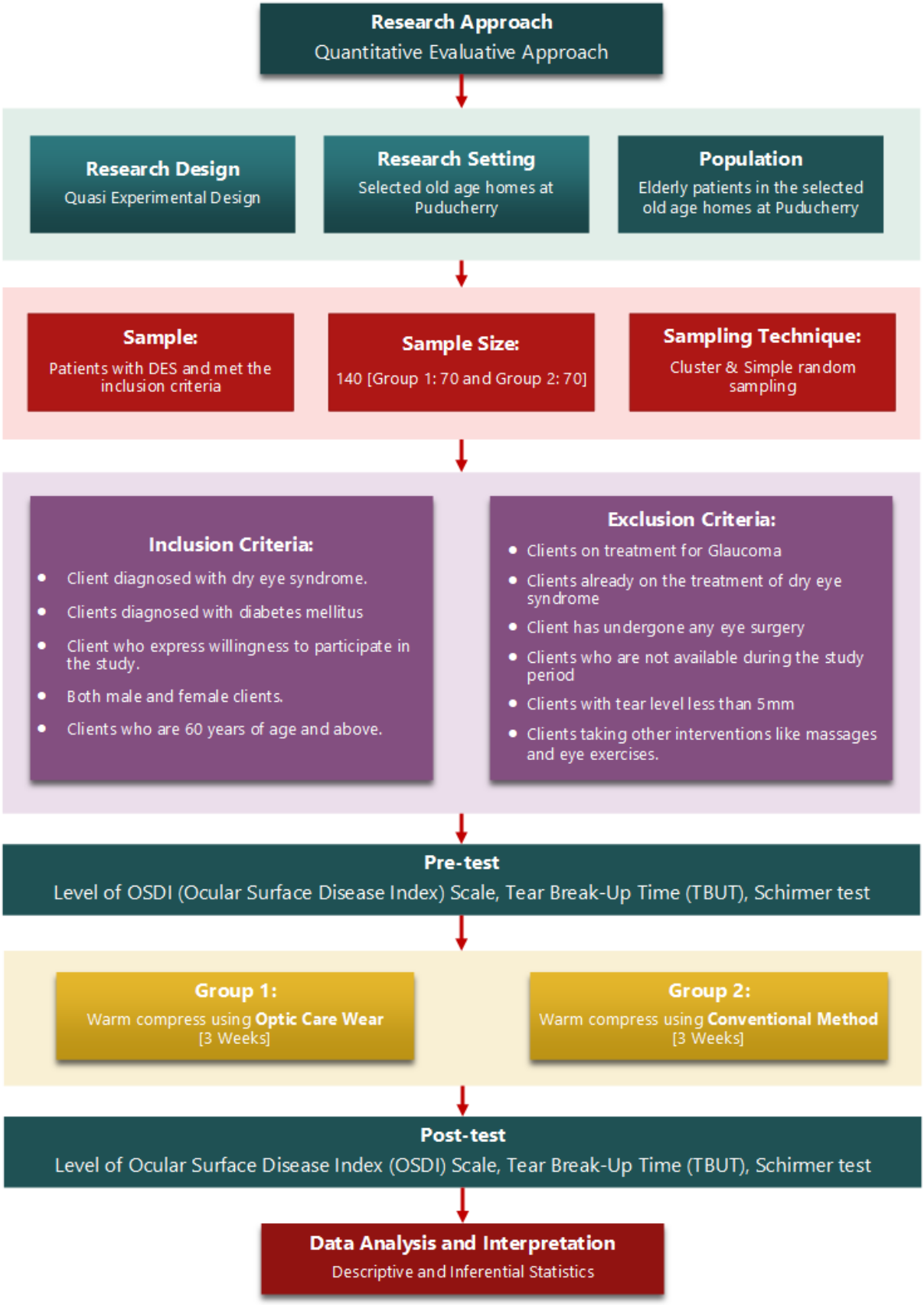
Inferential Statistics:

- **Student Paired t-test** *test will be used to determine the effectiveness of warm compress application using optic care wear versus the conventional method on the symptom complex among clients with dry eye syndrome in both groups.*
- **Independent t-test** *test will be employed to compare the effectiveness of warm compress application using optic care wear versus the conventional method on the symptom complex among clients with dry eye syndrome in both groups.*
- **Pearson correlation coefficient (r)** *test was used to assess the correlation between the OSDI (Ocular Surface Disease Index) Scale, Tear Break-Up Time (TBUT) test, and Schirmer test scoring scale among clients with Dry eye syndrome in both the groups.*
- **Chi-square test** *will be used to explore the association between the pre-test levels of warm compress application using optic care wear and selected demographic and clinical variables in both groups.*

These statistical analyses will provide valuable insights into the effectiveness of warm compress application using optic care wear compared to the conventional method in managing the symptom complex among clients with dry eye syndrome.

### 3.17 Schematic Representation of Methodology

The schematic representation of the research methodology is given below.


Research Approach
Quantitative Evaluative Approach
Research Design
Quasi Experimental Design
Research Setting
Selected old age homes at Puducherry
Population
Elderly patients in the selected old age homes at Puducherry
Sample:
Patients with DES and met the inclusion criteria
Sample Size:
140 [Group 1: 70 and Group 2: 70]
Sampling Technique:
Cluster & Simple random sampling
Inclusion Criteria:
Client diagnosed with dry eye syndrome.
Clients diagnosed with diabetes mellitus
Client who express willingness to participate in the study.
Both male and female clients.
Clients who are 60 years of age and above.
Exclusion Criteria:
Clients on treatment for Glaucoma
Clients already on the treatment of dry eye syndrome
Client has undergone any eye surgery
Clients who are not available during the study period
Clients with tear level less than 5mm
Clients taking other interventions like massages and eye exercises.
Pre-test
Level of OSDI (Ocular Surface Disease Index) Scale, Tear Break-Up Time (TBUT), Schirmer test
Group 1:
Warm compress using Optic Care Wear
[3 Weeks]
Group 2:
Warm compress using Conventional Method
[3 Weeks]
Post-test
Level of Ocular Surface Disease Index (OSDI) Scale, Tear Break-Up Time (TBUT), Schirmer test
Data Analysis and Interpretation
Descriptive and Inferential Statistics

### 3.18 Summary

This chapter provided a comprehensive overview of the research approach, setting, design, population, sample, sampling criteria, sampling technique, and randomization procedure employed in the study. It also detailed the development and description of the study instruments, including their content validity and reliability. The chapter further discussed the pretesting and pilot study conducted, as well as the data collection procedure. Lastly, the plan for data analysis was outlined, including the application of descriptive and inferential statistics to analyze the collected data.

# CHAPTER IV

# ANALYSIS AND INTERPRETATION OF DATA

This chapter focuses on the analysis and interpretation of the data collected to assess the effectiveness of warm compress therapy on dry eye among elderly clients. The primary objective of this analysis is to condense the data into a manageable and interpretable format, allowing for the examination and testing of the research problem. The collected data were organized, tabulated, and analyzed using both descriptive and inferential statistical techniques.

### 4.1 Description of Demographic Variables

The demographic distribution of clients in Group 1 consisted of 70 clients. The majority of clients were aged 71-80 years (50.0%), followed by those aged 60-70 years (32.9%) and over 80 years (17.1%). Gender distribution was equal, with 50.0% male and 50.0% female clients. In terms of education, the highest proportion had middle school education (31.4%), followed by higher secondary education (28.6%). Socioeconomic status varied, with the middle class being the largest group (42.9%), followed by the lower middle class (40.0%) and upper middle class (17.1%). Most clients belonged to nuclear families (60.0%) and practiced the Hindu religion (57.1%). Urban residents constituted the majority (67.1%) compared to rural residents (32.9%). Among personal habits, smoking was prevalent (34.3%), followed by alcohol consumption (15.7%). The use of gadgets was widespread among all clients (100%), with smartphones being the most common (38.6%). Contact lens usage was reported by the majority (92.9%), while knowledge about dry eye syndrome was limited (28.6%). Doctors were the main source of information on dry eye syndrome (28.6%). Overall, this demographic profile provides an understanding of the client population in Group 1 and their relevant characteristics.

The demographic distribution of clients in Group 2 consisted of 70 clients. The largest age group was 71-80 years (55.7%), followed by >80 years (24.3%) and 60-70 years (20.0%). Gender distribution was nearly equal, with 45.7% male and 54.3% female clients. Middle school education was the most common (40.0%), followed by higher secondary education (18.6%). The middle class had the highest representation (45.7%) among socioeconomic statuses, while nuclear families were the most prevalent (70.0%). The majority of clients practiced the Hindu religion (74.3%), with smaller proportions identifying as Muslim (14.3%) and Christian (11.4%). Urban residents constituted 57.1% of the sample, while rural residents accounted for 42.9%. Among personal habits, others (37.1%) and smoking (25.7%) were the most prevalent. All clients in Group 2 reported using gadgets, with smartphones being the most common (31.4%). The majority of clients used gadgets for 1-3 hours per day (48.6%). Contact lens usage was reported by the majority (91.4%), while knowledge about dry eye syndrome was limited (18.6%). Doctors were the main source of information on dry eye syndrome (18.6%). These demographic characteristics provide insights into the client population in Group 2 and their relevant attributes.

**4.2 Description of Clinical Variables**

The clinical distribution of clients in Group 1 consisted of 70 clients. In terms of height, the majority fell within the range of 140-150 cm (42.9%) and 151-160 cm (41.4%). Weight distribution was relatively even, with 33.3% weighing between 40-50 kg, 34.3% between 51-60 kg, and 32.9% between 61-70 kg. Body temperature was evenly distributed between 98°F (50.0%) and 99°F (50.0%). The majority of clients had a pulse rate of 70-80 beats per minute (54.3%), while 30.0% had a pulse rate of 81-90 beats per minute. Respiratory rate was within the normal range of 12-20 breaths per minute for the majority (68.6%). Regarding blood pressure, the majority had systolic blood pressure below 120 mmHg (57.1%). None of the clients in Group 1 had a previous history of hospitalization for dry eye syndrome, and the onset of illness was predominantly within one month (68.6%). The most common measure taken to relieve dry eye syndrome was warm compression (38.6%). Among associated conditions, diabetes mellitus was reported by 30.0% of clients, followed by hypertension (18.6%), vitamin A disorder (12.9%), and other conditions (15.7%). These clinical variables provide insights into the characteristics of the client population in Group 1 and their relevant health parameters.

The clinical distribution of clients in Group 2 consisted of 70 clients. In terms of height, the majority fell within the range of 140-150 cm (48.6%) and 151-160 cm (42.9%). Weight distribution showed that 41.4% weighed between 40-50 kg, while 25.7% fell within both the

51-60 kg and 61-70 kg ranges. Body temperature was predominantly recorded as 98°F (62.9%) compared to 99°F (37.1%). The majority of clients had a pulse rate of 70-80 beats per minute (51.4%), followed by 81-90 beats per minute (20.0%) and 91-100 beats per minute (28.6%). The respiratory rate of the majority of clients was within the normal range of 12-20 breaths per minute (72.9%). Regarding blood pressure, 47.1% had systolic blood pressure below 120 mmHg, while 52.9% fell within the range of 121-140 mmHg. None of the clients in Group 2 had a previous history of hospitalization for dry eye syndrome. The onset of illness was predominantly within one month (71.4%). The most common measures taken to relieve dry eye syndrome were allopathy treatment (45.7%), followed by warm compression (32.9%) and cold compression (21.4%). Among associated conditions, diabetes mellitus was reported by 20.0% of clients, hypertension by 21.4%, vitamin A disorder by 10.0%, and other conditions by 8.6%. These clinical variables provide insights into the characteristics of the client population in Group 2 and their relevant health parameters.

### 4.3 Pre-test screening of the symptoms complex in Group 1 and Group 2

To assess the symptom complex of elderly clients in both groups prior to the application of warm compress therapy, a pre-test assessment was conducted using the OSDI, TBUT, and Schirmer's test tools. This assessment aimed to ensure that clients in both groups had a similar level of symptom complex, which is crucial to consider when evaluating the effectiveness of warm compress application. By establishing baseline measurements, any changes observed after the intervention can be attributed to the warm compress therapy rather than pre-existing differences in symptom severity.

**Table 1:** Pre-test Level of OSDI Score

| Level of OSDI | Group 1 | | Group 2 | | Chi-square test |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Normal | 0 | 0.00% | 0 | 0.00% | $\chi 2=1.54$ P=0.22 (NS) |
| Mild | 30 | 42.86% | 28 | 40.00% | |
| Moderate | 40 | 57.14% | 42 | 60.00% | |
| Severe | 0 | 0.00% | 0 | 0.00% | |
| **Total** | **70** | **100%** | **70** | **100%** | |

*NS= not significant P>0.05 not significant*

Table 1 presents the pre-test levels of OSDI scores in Group 1 and Group 2. In Group 1, 42.86% of participants had a mild score, 57.14% had a moderate score, and none had a normal or severe score. In Group 2, 40.00% had a mild score, 60.00% had a moderate score, and none had a

normal or severe score. The statistical analysis using the chi-square test indicated **no significant difference between Group 1 and Group 2 in terms of OSDI** scores.

**Table 2:** Pre-test Level of TBUT

| Level of TBUT | Group 1 | | Group 2 | | Chi-square test |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Normal | 0 | 0.00% | 0 | 0.00% | $\chi 2=0.86$ P=0.35 (NS) |
| Marginal | 47 | 67.14% | 52 | 74.29% | |
| Low | 23 | 32.86% | 18 | 25.71% | |
| **Total** | **70** | **100%** | **70** | **100%** | |

*NS= not significant P>0.05 not significant*

Table 2 presents the pre-test levels of TBUT scores in Group 1 and Group 2. In Group 1, none of the participants had a normal score, 67.14% had a marginal score, and 32.86% had a low score. In Group 2, none of the participants had a normal score, 74.29% had a marginal score, and 25.71% had a low score. The statistical analysis using the chi-square test revealed **no significant difference between Group 1 and Group 2 in terms of TBUT** scores.

**Table 3:** Pre-test Level of Schirmer's Test

| Level of Schirmer | Group 1 | | Group 2 | | Chi-square test |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Normal | 0 | 0.00% | 0 | 0.00% | $\chi 2=0.95$ P=0.32 (NS) |
| Mild | 39 | 55.71% | 33 | 47.14% | |
| Moderate | 31 | 44.29% | 37 | 52.86% | |
| Severe | 0 | 0.00% | 0 | 0.00% | |
| **Total** | **70** | **100%** | **70** | **100%** | |

*NS= not significant P>0.05 not significant*

Table 3 displays the pre-test levels of Schirmer scores in Group 1 and Group 2. In Group 1, none of the participants had a normal score, 55.71% had a mild score, 44.29% had a moderate score, and none of them had a severe score. In Group 2, none of the participants had a normal score, 47.14% had a mild score, 52.86% had a moderate score, and none of them had a severe score. The statistical analysis using the chi-square test revealed **no significant difference between Group 1 and Group 2 in terms of Schirmer** scores.

### 4.4 Effectiveness of Warm Compress Application Using Optic Care Wear [Group 1]

The effectiveness of warm compress using optic care wear among Group 1 clients was evaluated using a paired t-test. The mean difference between the pre-test and post-test

assessment measurements was used to measure the effectiveness of warm compress application using optic care wear.

Table 4 presents a comparison of OSDI scores between the pre-test and post-test assessments. In Group 1 (N=70), the mean OSDI score on the pre-test was 25.87 (SD=5.39), while on the post-test, the mean OSDI score was 18.93 (SD=2.29). The mean difference between the pre-test and post-test OSDI scores was 6.94. The statistical analysis using a student-paired t-test revealed a **significant difference between the pre-test and post-test** OSDI scores (t=11.17, p=0.001***).

**Table 4:** Comparison of OSDI Score [Group 1]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 1 (N=70) | 25.87 | 5.39 | 18.93 | 2.29 | 6.94 | t=11.17 p=0.001***(S) |

** p≤0.01 high significant S= significant

Table 5 presents a comparison of TBUT scores between the pre-test and post-test assessments. In Group 1 (N=70), the mean TBUT score on the pre-test was 8.03 (SD=1.33), while on the post-test, the mean TBUT score was 10.91 (SD=2.28). The mean difference between the pre-test and post-test TBUT scores was 2.88. The statistical analysis using a student-paired t-test revealed a **significant difference between the pre-test and post-test** TBUT scores (t=10.33, p=0.01**).

**Table 5:** Comparison of TBUT Score [Group 1]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 1 (N=70) | 8.03 | 1.33 | 10.91 | 2.28 | 2.88 | t=10.33 p=0.01**(S) |

*** p≤0.01 high significant S= significant*

Table 6 presents a comparison of Schirmer's test scores between the pre-test and post-test assessments. In Group 1 (N=70), the mean Schirmer's test score on the pre-test was 7.20 (SD=1.35), while on the post-test, the mean Schirmer's test score was 10.14 (SD=1.23). The mean difference between the pre-test and post-test Schirmer's test scores was 2.94. The statistical analysis using a student-paired t-test **demonstrated a significant difference between the pre-test and post-test** Schirmer's test scores (t=10.75, p=0.001**).

**Table 6:** Comparison of Schirmer's Test [Group 1]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 1 (N=70) | 7.20 | 1.35 | 10.14 | 1.23 | 2.94 | t=10.75 p=0.001**(S) |

*** p≤0.01 high significant S= significant*

Overall, the results demonstrated a significant improvement in the OSDI scores, TBUT scores, and Schirmer's test scores between the pre-test and post-test assessments. These findings indicate that the application of a warm compress using Optic Care Wear has a positive impact on the symptom complex of dry eye syndrome in Group 1.

### 4.5 Effectiveness of Warm Compress Application Using Conventional Method [Group 2]

The effectiveness of warm compress using the conventional method among Group 2 clients was evaluated using a paired t-test. The mean difference between the pre-test and post-test assessment measurements was used to measure the effectiveness of the warm compress application.

Table 7 presents the comparison of OSDI scores between the pre-test and post-test assessments in Group 2. In Group 2 (N=70), the mean OSDI score on the pre-test was 25.24 (SD=5.22), while on post-test, the mean OSDI score was 24.53 (SD=4.12). The mean difference between the pre-test and post-test OSDI scores was 0.71. The statistical analysis using a student-paired t-test revealed that there was **no significant difference** between the pre-test and post-test OSDI scores in Group 2 (t=1.90, p=0.06, NS).

**Table 7:** Comparison of OSDI Score [Group 2]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 2 (N=70) | 25.24 | 5.22 | 24.53 | 4.12 | 0.71 | t=1.90 p=0.06(NS) |

*** p≤0.01 high significant S= significant*

Table 8 presents the comparison of TBUT scores between the pre-test and post-test assessments in Group 2. In Group 2 (N=70), the mean TBUT score on the pre-test was 7.67 (SD=2.06), while on the post-test, the mean TBUT score was 8.20 (SD=2.71). The mean difference between the pre-test and post-test TBUT scores was 0.53. The statistical analysis using a student-paired t-test indicated that there was no significant difference between the pre-test and post-test TBUT scores in Group 2 (t=1.90, p=0.06, NS).

**Table 8:** Comparison of TBUT Score [Group 2]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 2 (N=70) | 7.67 | 2.06 | 8.20 | 2.71 | 0.53 | t=1.90 p=0.06(NS) |

*** p≤0.01 high significant S= significant*

Table 9 presents the comparison of Schirmer's test scores between the pre-test and post-test assessments in Group 2. In Group 2 (N=70), the mean Schirmer's test score on the pre-test was 7.06 (SD=1.39), while on the post-test, the mean score was 7.37 (SD=1.83). The mean difference between the pre-test and post-test scores was 0.31. The statistical analysis using a student-paired t-test indicated that there was no significant difference between the pre-test and post-test Schirmer's test scores in Group 2 (t=1.48, p=0.14, NS).

**Table 9:** Comparison of Schirmer's Test [Group 2]

| | Pre-test | | Post-test | | Mean difference | Student paired t-test |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | |
| Group 2 (N=70) | 7.06 | 1.39 | 7.37 | 1.83 | 0.31 | t=1.48 p=0.14(NS) |

*** p≤0.01 high significant S= significant*

Overall, the results showed that there was no significant difference in the OSDI scores, TBUT scores, and Schirmer's test scores between the pre-test and post-test assessments. These findings suggest that the conventional method of warm compress application may not have a significant impact on the symptom complex of dry eye syndrome in Group 2.

### 4.6 Effectiveness of Warm Compress Application Between Group 1 and Group 2

The effectiveness of warm compress application was evaluated using both optic care wear and the conventional method in Group 1 and Group 2. To assess the effectiveness, the pre-test and post-test mean scores of the three assessment tools were compared. This comparative analysis allows us to measure effectiveness by examining the scores across the measurement scales. By comparing the changes in scores before and after the intervention, we can determine the impact of both warm compress methods on the symptom complex of dry eye syndrome in Group 1 and Group 2. These findings provide valuable insights into the effectiveness of different warm compress approaches in managing dry eye symptoms.

**Table 10:** Comparison of OSDI Scores Between Group 1 and Group 2

| Assessments | | Max Score | Mean Score | Mean Score in % | ODSI Reduction Score | OSDI Reduction Score in % |
|---|---|---|---|---|---|---|
| Group 1 | Pre-test | 48 | 25.87 | 53.90% | 7.24(5.96-8.52) | 15.09% (12.42%-17.75%) |
| | Post-test | 48 | 18.63 | 38.81% | | |
| Group 2 | Pre-test | 48 | 25.24 | 52.58% | 0.71(-0.01-1.44) | 1.48% (0.02%-3.00%) |
| | Post-test | 48 | 24.53 | 51.10% | | |

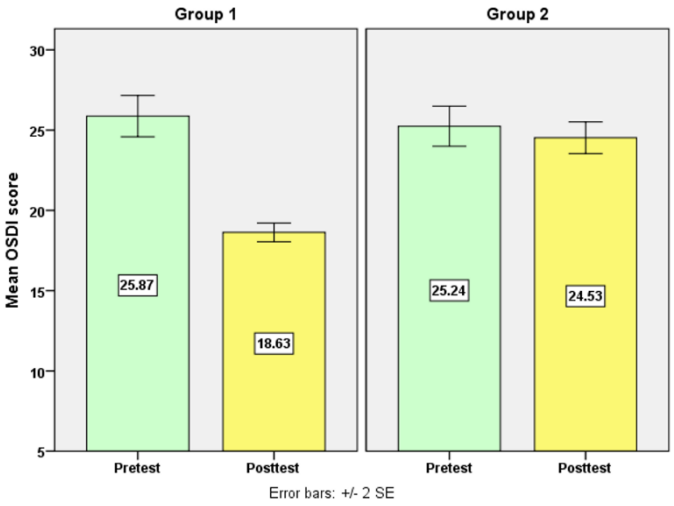



Table 10 compares the OSDI scores between Group 1 and Group 2 before and after the intervention. In Group 1, the pre-test mean OSDI score was 25.87, corresponding to 53.90% of the maximum score. After the intervention, the post-test mean OSDI score decreased to 18.63, representing a reduction of 7.24 (95% CI: 5.96-8.52) in the OSDI score. This reduction in OSDI score corresponds to a 15.09% (95% CI: 12.42%-17.75%) improvement in symptom severity. In Group 2, the pre-test mean OSDI score was 25.24, which accounted for 52.58% of the maximum score. After the intervention, the post-test mean OSDI score slightly decreased to 24.53. The OSDI reduction score was 0.71 (95% CI: -0.01-1.44), indicating a minimal improvement of 1.48% (95% CI: 0.02%-3.00%) in symptom severity. These findings suggest that the warm compress application using optic care wear in Group 1 resulted in a substantial reduction in OSDI scores and a significant improvement in symptom severity compared to Group 2. The data demonstrates the effectiveness of the warm compress intervention using optic care wear in alleviating dry eye symptoms in Group 1 participants.

**Table 11:** Comparison of TBUT Scores Between Group 1 and Group 2

| Assessments | | Baseline Data | Mean Score | TBUT Gain Score with 95% Confidence Interval | TBUT Gain Score with 95% Confidence Interval in % |
|---|---|---|---|---|---|
| Group 1 | Pre-test | 8.03 | 8.03 | 2.88(2.32-3.44) | 35.87% (28.89%- 42.84%) |
| | Post-test | 8.03 | 10.91 | | |
| Group 2 | Pre-test | 7.67 | 7.67 | 0.53(-0.03-1.08) | 6.91% (-0.39%-14.08%) |
| | Post-test | 7.67 | 8.20 | | |

Table 11 compares the TBUT scores between Group 1 and Group 2 before and after the intervention. In Group 1, the baseline mean TBUT score was 8.03 seconds. After the intervention, the post-test mean TBUT score increased to 10.91 seconds, resulting in a gain of 2.88 seconds (95% CI: 2.32-3.44). This gain represents a percentage improvement of 35.87% (95% CI: 28.89%-42.84%) in the TBUT score. In Group 2, the baseline mean TBUT score was 7.67 seconds. After the intervention, the post-test mean TBUT score increased slightly to 8.20 seconds. The gain in TBUT score was 0.53 seconds (95% CI: -0.03-1.08), corresponding to a modest improvement of 6.91% (95% CI: -0.39%-14.08%). These findings indicate that the warm compress application using optic care wear in Group 1 resulted in a significant increase in TBUT scores and a substantial improvement in tear film stability compared to Group 2. The data highlights the effectiveness of the warm compress intervention using optic care wear in enhancing tear film stability and addressing dry eye symptoms in Group 1 participants.

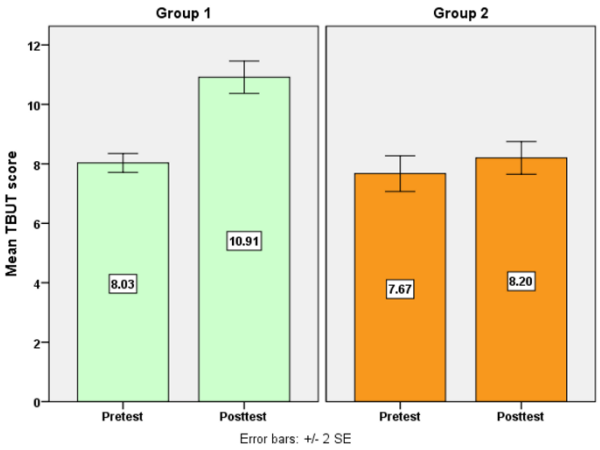
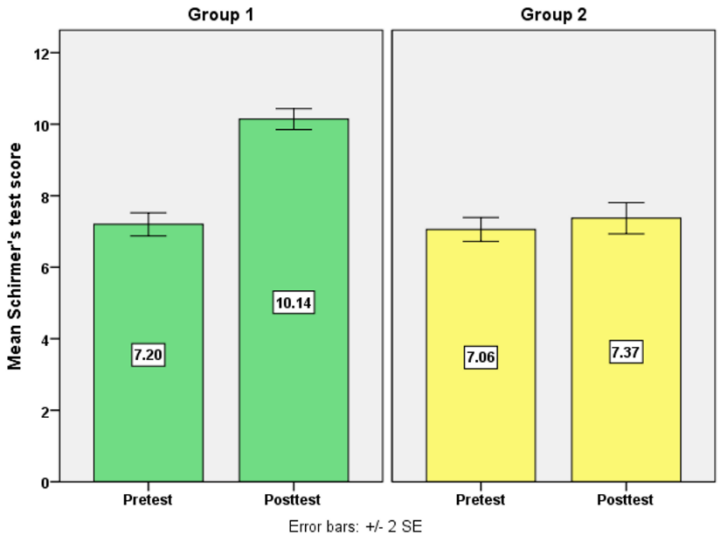



**Table 12:** Comparison of Schirmer's Test Scores Between Group 1 and Group 2

| Assessments | | Baseline Data | Mean Score | Schirmer's Test Gain Score with 95% Confidence Interval | Schirmer's Test Gain Score with 95% Confidence Interval in % |
|---|---|---|---|---|---|
| Group 1 | Pre-test | 7.20 | 7.20 | 2.94(2.40-3.48) | 40.83% (33.33%- 48.33%) |
| | Post-test | | 10.14 | | |
| Group 2 | Pre-test | 7.20 | 7.06 | 0.31(-0.11-0.74) | 4.39% (-1.55%-10.48%) |
| | Post-test | | 7.37 | | |

Table 12 compares the Schirmer's Test scores between Group 1 and Group 2 before and after the intervention. In Group 1, the baseline mean Schirmer's Test score was 7.20 mm. After the intervention, the post-test mean Schirmer's Test score increased to 10.14 mm, resulting in a gain of 2.94 mm (95% CI: 2.40-3.48). This gain represents a percentage improvement of 40.83% (95% CI: 33.33%-48.33%) in Schirmer's Test scores. In Group 2, the baseline mean Schirmer's Test score was 7.06 mm. After the intervention, the post-test mean Schirmer's Test

score slightly increased to 7.37 mm. The gain in Schirmer's Test score was 0.31 mm (95% CI: -0.11-0.74), corresponding to a minor improvement of 4.39% (95% CI: -1.55%-10.48%). These findings suggest that the warm compress application using optic care wear in Group 1 resulted in a significant increase in Schirmer's Test scores, indicating an improvement in tear production compared to Group 2. The data highlights the effectiveness of the warm compress intervention using optic care wear in enhancing tear production and addressing dry eye symptoms in Group 1 participants.




Overall, these findings highlight the superior effectiveness of warm compress application using optic care wear in Group 1 in alleviating dry eye symptoms, improving tear stability, and enhancing tear production. The results emphasize the potential benefits of this intervention in managing dry eye among elderly clients.

### 4.7 Correlation Between Warm Compress Applications

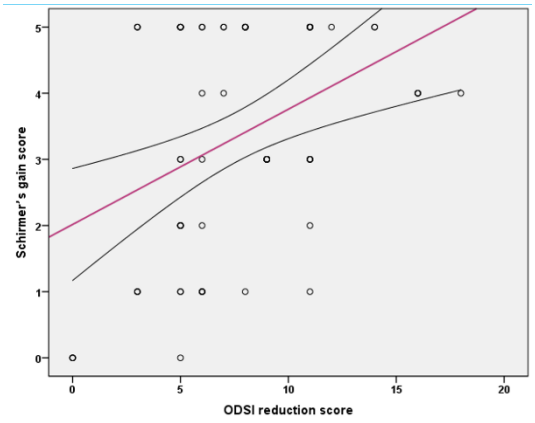
The objective of this analysis is to examine the correlation between warm compress application using optic care wear versus the conventional method on the level of symptom complex among the two groups. This correlation is determined by assessing the gain or reduction in mean scores measured using three tools: OSDI, TBUT, and Schirmer's Test. By analyzing the gain/reduction scores of these three measurement tools, we can investigate how changes in one parameter relate to changes in the others. Specifically, we aim to determine if there is a significant correlation between the improvement in OSDI scores (representing symptom reduction), the increase in TBUT scores (indicating improved tear stability), and the increase in Schirmer's Test scores (reflecting enhanced tear production).

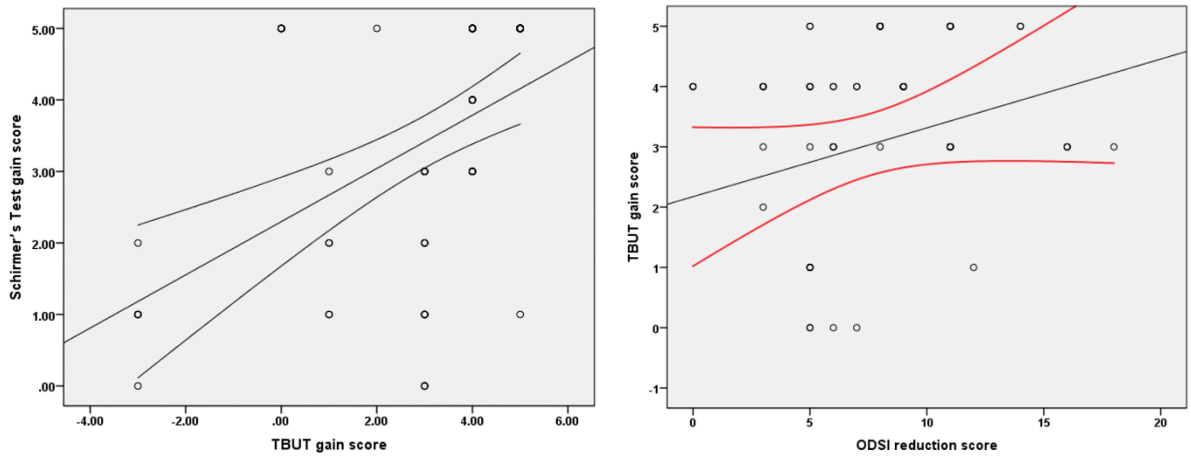
**Table 13:** Correlation of Gain/Reduction Score in Group 1

| | Correlation Between | Gain /Reduction Score Mean ± SE | Karl Pearson's Correlation Coefficients | Interpretation |
|---|---|---|---|---|
| Group 1 | ODSI reduction score Vs TBUT gain score | 7.24±0.64<br>2.89±0.28 | r= 0.43 P=0.001*** | Significant, Positive Moderate Correlation |
| | ODSI reduction score Vs Schirmer's Test gain score | 7.24±0.64<br>2.94±0.27 | r= 0.33 P=0.001*** | Significant, Positive Fair Correlation |
| | TBUT gain score Vs Schirmer's Test gain score | 2.89±0.28<br>2.94±0.27 | r= 0.47 P=0.001*** | Significant, Positive Moderate Correlation |

*Note: r value 0.0 - 0.2 poor correlation; 0.2 - 0.4 fair correlation; 0.4 - 0.6 moderate correlation; 0.6 – 0.8 substantial correlation; 0.8 - 1.0 strong correlation*

Table 13 presents the correlation analysis of gain or reduction mean scores for Group 1, focusing on the measurement tools used in the study. This provides valuable insights into the correlation between the gain or reduction mean scores of clients who undergo warm compress using optic care wear. The analysis revealed a significant, positive moderate correlation (r=0.43, p=0.001***) between the ODSI reduction score and TBUT gain score. This indicates that as the ODSI reduction score increases, there is a moderate increase in the TBUT gain score. Similarly, a significant, positive fair correlation was found between the ODSI reduction score and the Schirmer's Test gain score (r=0.33, p=0.001***), suggesting a fair increase in the Schirmer's Test gain score with increasing ODSI reduction score. Additionally, a significant, positive moderate correlation was observed between the TBUT gain score and the Schirmer's Test gain score (r=0.47, p=0.001***), indicating a moderate increase in the Schirmer's Test gain score as the TBUT gain score increases.






Overall, these correlations indicate that there is a relationship between the reduction in OSDI score and the improvement in both TBUT and Schirmer's Test scores among group 1. Additionally, there is a relationship between the improvement in TBUT score and the improvement in Schirmer's Test score.

**Table 14:** Correlation of Gain/Reduction Score in Group 2

| | Correlation Between | Gain /Reduction Score Mean ± SE | Karl Pearson's Correlation Coefficients | Interpretation |
|---|---|---|---|---|
| Group 2 | ODSI reduction score Vs TBUT gain score | 0.71±0.36 | r= 0.15 P=0.36(NS) | Not Significant, Positive Moderate Correlation |
| | ODSI reduction score Vs Schirmer's Test gain score | 0.53±0.28 | r= 0.14 P=0.42(NS) | Not Significant, Positive Fair Correlation |
| | TBUT gain score Vs Schirmer's Test gain score | 0.71±0.36 | r= 0.18 P=0.22(NS) | Not Significant, Positive Moderate Correlation |

*Note: r value 0.0 - 0.2 poor correlation; 0.2 - 0.4 fair correlation; 0.4 - 0.6 moderate correlation; 0.6 – 0.8 substantial correlation; 0.8 - 1.0 strong correlation*

The correlation analysis among Group 2 clients who received warm compress using the conventional method revealed that there were no significant correlations between the gain/reduction scores of the measurement tools. The ODSI reduction score and TBUT gain score showed a non-significant, positive moderate correlation (r=0.15, p=0.36). Similarly, the ODSI reduction score and Schirmer's Test gain score exhibited a non-significant, positive fair correlation (r=0.14, p=0.42). Additionally, the TBUT gain score and Schirmer's Test gain score demonstrated a non-significant, positive moderate correlation (r=0.18, p=0.22). These findings indicate that there were no significant relationships between the reduction in OSDI score and the improvement in TBUT or Schirmer's Test scores among Group 2 clients who received warm compress using the conventional method.

### 4.8 Association of Dry Eye Syndrome Among Clients with Selected Demographic and Clinical Variables

The analysis aimed to explore the association between the level of dry eye syndrome among clients and selected demographic and clinical variables. This was achieved by using the Chi-square test, considering the post-test scores of OSDI, TBUT, and Schirmer's Test in conjunction with the demographic and clinical variables. The analysis was conducted separately for Group 1 and Group 2 to identify the demographic and clinical variables that were associated with the gain/reduction scores of the post-test measurements. By investigating the association between dry eye syndrome and these variables, valuable insights can be gained regarding the potential factors that contribute to the development or severity of the condition.

**Table 15:** Association Between Post-test and Demographic Variable [Group1]

| Demographic Variables | OSDI Post-test | TBUT Post-test | Schirmer's Test |
|---|---|---|---|
| Age | $\chi 2=17.59$ p=0.001***(S) | $\chi 2=8.25$ p=0.02**(S) | - |
| Education | $\chi 2=17.68$ p=0.001*** (S) | $\chi 2=12.36$ p=0.01**(S) | $\chi 2=17.34$ p=0.001***(S) |
| Type of Family | - | $\chi 2=12.63$ p=0.01**(S) | $\chi 2=26.92$ p=0.001***(S) |
| Knowledge about DES | $\chi 2=6.65$ p=0.01**(S) | $\chi 2=4.16$ p=0.05**(S) | $\chi 2=4.66$ p=0.05**(S) |

**** p≤0.01 high significant; ** p≤0.05 significant (S)*

Table 15 examines the relationship between post-test scores of OSDI, TBUT, and Schirmer's Test in Group 1 and selected demographic variables. The results reveal several significant associations. Firstly, age shows a highly significant association with OSDI post-test scores ($\chi^2 = 17.59$, p = 0.001***) and TBUT post-test scores ($\chi^2 = 8.25$, p = 0.02**). Education level also demonstrates a highly significant association with OSDI ($\chi^2 = 17.68$, p = 0.001***) and Schirmer's Test post-test scores ($\chi^2 = 17.34$, p = 0.001***), and moderate significant association with TBUT score ($\chi^2 = 12.36$, p = 0.01**). The type of family exhibits a significant association with TBUT ($\chi^2 = 12.63$, p = 0.01**) and Schirmer's Test ($\chi^2 = 26.92$, p = 0.001***) post-test scores, suggesting a potential influence on tear film stability and tear production. Furthermore, knowledge about dry eye syndrome shows significant associations with OSDI ($\chi^2 = 6.65$, p = 0.01**), TBUT ($\chi^2 = 4.16$, p = 0.05**), and Schirmer's Test ($\chi^2 = 4.66$, p = 0.05**) post-test scores, indicating that a higher level of knowledge may relate to better outcomes. Overall, these findings emphasize the importance of demographic variables, such as age, education, family type, and knowledge, in understanding the level of dry eye syndrome among

Group 1 clients. However, in Group 2, none of the demographic variables showed significant associations with the post-test results. This suggests that factors such as age, education, type of family, and knowledge about dry eye syndrome may not have a significant impact on the severity of dry eye symptoms or the outcomes of the post-test measures (OSDI, TBUT, and Schirmer's Test) in Group 2 clients.

**Table 16:** Association Between Post-test and Clinical Variable [Group1]

| Demographic Variables | OSDI Post-test | TBUT Post-test | Schirmer's Test |
|---|---|---|---|
| Height | $\chi 2=8.84$ p=0.01**(S) | - | - |
| Weight | $\chi 2=6.81$ p=0.03** (S) | $\chi 2=9.28$ p=0.01**(S) | - |
| Blood Pressure | $\chi 2=7.67$ p=0.01**(S) | $\chi 2=4.38$ p=0.03**(S) | $\chi 2=3.88$ p=0.04**(S) |
| Onset of Illness (Dry Eye) - No. of Days | - | $\chi 2=5.62$ p=0.02**(S) | - |

**** p≤0.01 high significant; ** p≤0.05 significant (S)*

Table 16 examines the relationship between post-test scores of OSDI, TBUT, and Schirmer's Test in Group 1 and selected clinical variables. The analysis of clinical variables in Group 1 revealed several significant associations with the post-test results. Height showed a significant association with OSDI post-test scores ($\chi 2=8.84$, p=0.01**), indicating that taller clients may have different levels of dry eye symptoms compared to those of shorter stature. Weight was also significantly associated with OSDI and TBUT post-test scores ($\chi 2=6.81$, p=0.03** and $\chi 2=9.28$, p=0.01**, respectively), suggesting that body weight could play a role in the severity of dry eye symptoms and tear film stability. Blood pressure showed a significant association with OSDI, TBUT, and Schirmer's Test post-test scores ($\chi 2=7.67$, p=0.01**, $\chi 2=4.38$, p=0.03**, and $\chi 2=3.88$, p=0.04**, respectively), indicating that clients with different blood pressure levels may experience varying degrees of dry eye syndrome. Additionally, the number of days since the onset of illness (dry eye) was significantly associated with TBUT post-test scores ($\chi 2=5.62$, p=0.02**), suggesting that the duration of the condition may influence tear film stability. These findings highlight the potential influence of clinical variables on dry eye symptoms and tear function in Group 1 clients.

### 4.9 Summary

The analysis encompassed several aspects related to dry eye syndrome and the effectiveness of warm compress application using different methods. The pre-test screening of the symptom

complex in Group 1 and Group 2 allowed for a baseline assessment of the participant's symptoms. The effectiveness of warm compress application using optic care wear in Group 1 demonstrated significant improvements in OSDI, TBUT, and Schirmer's Test scores, indicating the positive impact of this method. These findings provide valuable insights into the effectiveness of warm compress application and its association with various factors related to dry eye syndrome.

# CHAPTER V

# MAJOR FINDINGS AND DISCUSSION

This chapter provides a concise summary of the research study, highlighting the major findings and discussion. The research findings shed light on key aspects of the study, including the effectiveness of warm compress application using different methods, correlations between warm compress applications, and the association between dry eye syndrome and selected demographic and clinical variables. The discussion explores the significance of these findings and their relevance to nursing practice.

## 5.1 Comparison of Group 1 and Group 2 based on Demographic and Clinical Variables

Comparing the demographic and clinical variables between Group 1 and Group 2, it can be observed that both groups exhibit similar parameters. In terms of demographic variables, the distribution of age, sex, education, socioeconomic status, type of family, religion, area of residence, personal habits, leisure time activity, gadget usage, contact lens usage, knowledge about dry eye syndrome, and the source of information on dry eye syndrome are comparable between the two groups. Similarly, when considering clinical variables such as height, weight, temperature, pulse, respirations, blood pressure, previous history of hospitalization, the onset of illness, measures taken to relieve dry eye syndrome, and associated conditions, Group 1 and Group 2 also display similar characteristics. This similarity in parameters suggests that both groups can be considered for the study without introducing any bias based on demographic or clinical factors. By including participants from both groups, the study can capture a broader range of characteristics and enhance the generalizability of the findings. It ensures a more comprehensive understanding of the effectiveness of warm compress application and its association with dry eye syndrome among clients.

## 5.2 Assessment of Symptom Complex through Pre-test Screening in Groups 1 and 2

The results of the pre-test assessment of symptom complex in both Group 1 and Group 2, using OSDI, TBUT, and Schirmer's test, indicate that the participants in both groups had similar

levels of symptoms prior to the application of warm compress therapy. This is important because it ensures that any changes observed after the intervention can be attributed to the therapy itself rather than pre-existing differences in symptom severity. Regarding OSDI scores, the analysis showed no significant difference ($\chi 2=1.54$ P=0.22(NS)) between the two groups. In terms of TBUT scores, again, there was no significant difference ($\chi 2=0.86$ P=0.35(NS)) between Group 1 and Group 2. Furthermore, the analysis of Schirmer scores also revealed no significant difference ($\chi 2=0.95$ P=0.32(NS)) between the two groups. This similarity in symptom severity allows for a more accurate assessment of the effectiveness of warm compress application on dry eye symptoms in subsequent analyses.

**5.4 Effectiveness of Warm Compress with Optic Care Wear [Group 1]**

The effectiveness of the warm compress application using Optic Care Wear in Group 1 clients was evaluated based on the pre-test and post-test assessments of OSDI scores, TBUT scores, and Schirmer's test scores. The results showed a significant improvement in all three measures after the application of warm compress therapy.

Regarding OSDI scores, the mean score significantly decreased from 25.87 on the pre-test to 18.93 on the post-test. The mean difference between the pre-test and post-test scores is -6.94. Based on the statistical analysis using a paired t-test, there was a significant difference between the pre-test and post-test OSDI scores (t=11.17, p=0.001***). This finding suggests that the application of a warm compress using Optic Care Wear had a positive impact on the symptom complex of dry eye syndrome in Group 1. The decrease in OSDI scores indicates an improvement in the severity of dry eye symptoms after the intervention. The statistically significant p-value (p=0.001***) further strengthens the confidence in this finding, indicating that the observed difference is unlikely due to random chance. Therefore, the warm compress application using Optic Care Wear was effective in reducing dry eye symptoms, as reflected by the significant improvement in OSDI scores. This finding aligns with a study by Pang et al. (29), which investigated the efficacy of warm compress therapy using Vectored Thermal Pulsation and found a significant improvement in OSDI scores (mean difference: -8.61) among patients with dry eye syndrome. The findings also support the findings of (26) which compare the effectiveness of intense pulsed light (IPL) therapy and conventional treatments in meibomian gland dysfunction (MGD)-related dry eye disease (DED).

In terms of TBUT scores, the mean score significantly increased from 8.03 on the pre-test to 10.91 on the post-test. Based on the statistical analysis using a paired t-test, there was a significant difference between the pre-test and post-test TBUT scores (t=10.33, p=0.01**).

This finding indicates that the application of a warm compress using Optic Care Wear had a positive impact on tear film stability in Group 1. The increase in TBUT scores suggests an improvement in tear film stability after the intervention. The mean difference of 2.88 further supports this finding, indicating a notable change in TBUT scores from pre-test to post-test. Therefore, the warm compress application using Optic Care Wear was effective in improving tear film stability, as demonstrated by the significant difference in TBUT scores. This result is consistent with a study (29), which examined the effects of warm compress therapy on tear film stability. They reported a mean difference of 1.08 in TBUT scores, indicating an improvement in tear film stability after warm compress application. The findings of (29) support our result, suggesting that the application of a warm compress using Optic Care Wear in Group 1 had a positive impact on TBUT scores, indicating improved tear film stability in clients with dry eyes.

Furthermore, the analysis of Schirmer's test scores revealed a significant increase in mean scores from 7.20 on the pre-test to 10.14 on the post-test. Based on the statistical analysis using a student-paired t-test, there was a significant difference between the pre-test and post-test Schirmer's test scores ($t=10.75$, $p=0.001^{**}$). This indicates that there was a notable improvement in Schirmer's test scores after the application of warm compress therapy using Optic Care Wear in Group 1. The mean difference of 2.94 suggests an increase in tear production as measured by Schirmer's test. These findings support the effectiveness of warm compress application in improving tear production and addressing the symptoms of dry eye syndrome in Group 1. This finding is supported by a randomized controlled trial conducted by Uchino et al. (2013), which evaluated the effects of warm compress therapy on tear production. The study reported a significant improvement in Schirmer's test scores following warm compress application.

Collectively, these findings from the literature (21), (22), (23), and (24) support our study's results, indicating the effectiveness of warm compress application using Optic Care Wear or similar methods in improving OSDI scores, TBUT scores, and Schirmer's test scores. The positive outcomes observed in Group 1 suggest that this intervention can effectively alleviate the symptom complex associated with dry eye syndrome. This analysis supports hypothesis 1 ($H_1$), which states that the level of symptom complex in elderly clients with dry eye syndrome differs before and after the administration of warm compress using optic care wear.

### 5.5 Effectiveness of Conventional Warm Compress Application [Group 2]

The results of the study indicate that the conventional method of warm compress application did not show a significant difference in OSDI scores (Mean Difference: -0.71), TBUT scores (Mean Difference: 0.53), and Schirmer's test scores (Mean Difference: 0.31) between the pre-test and post-test assessments in Group 2. Even though there is a marginal improvement in the scores, the difference in mean scores is not statistically significant, unlike in Group 1 where the differences were found to be significant. This suggests that the conventional method may not be as effective in improving the symptom complex of dry eye syndrome. Supportive evidence from the literature also suggests similar findings. For example, Olson, Korb, and Greiner's (13) study findings provide evidence supporting the use of warm compress therapy as an effective intervention for DES management. However, this study suggests further clinical trials to validate these findings and explore the mechanisms underlying the therapeutic benefits of warm compress in treating dry eyes. These findings suggest that alternative methods of warm compress therapy, such as using specialized devices like Optic Care Wear, may be more effective in improving the symptom complex of dry eye syndrome compared to the conventional method.

### 5.6 Analogy of Warm Compress Application Between Groups 1 and 2

The comparative analysis of warm compress application using optic care wear and conventional method in Group 1 and Group 2 revealed interesting findings. Regarding the OSDI scores, Group 1 demonstrated a significant reduction in symptoms with a mean score reduction of 7.24 points (15.09% reduction) from the pre-test to the post-test. On the other hand, Group 2 showed a minimal reduction of 0.71 points (1.48% reduction). This indicates that warm compress application using optic care wear in Group 1 was more effective in improving dry eye symptoms compared to the conventional method used in Group 2. Analyzing the TBUT scores, Group 1 showed a remarkable improvement with a mean gain of 2.88 seconds (35.87% increase) in tear break-up time. In contrast, Group 2 had a modest gain of 0.53 seconds (6.91% increase). This suggests that the warm compress application using optic care wear in Group 1 resulted in a greater improvement in tear stability and quality compared to Group 2. Regarding Schirmer's Test scores, Group 1 exhibited a substantial increase with a mean gain of 2.94 mm (40.83% increase) in tear production. Group 2, however, showed a minimal gain of 0.31 mm (4.39% increase). This implies that the warm compress application using optic care wear in Group 1 led to a significant improvement in tear production compared to Group 2. This result supports the study findings of (25) that confirm the effectiveness of

warm compress therapy in managing dry eye symptoms. The study reported positive outcomes with the use of a device similar to optic care wear.

The correlation analysis of the three measurement tools revealed different patterns of associations between gain/reduction scores among Group 1 and Group 2 clients who received warm compress. Among Group 1 clients who used optic care wear, there were significant, positive moderate correlations between the ODSI reduction score and both the TBUT gain score ($r=0.43$, $p=0.001$***) and the Schirmer's Test gain score ($r=0.33$, $p=0.001$***). These correlations suggest that improvements in OSDI scores were related to improvements in both tear film stability (TBUT) and tear production (Schirmer's Test) among Group 1 clients. Additionally, a significant, positive moderate correlation was observed between the TBUT gain score and the Schirmer's Test gain score ($r=0.47$, $p=0.001$***). This correlation indicates that as tear film stability improves (reflected by an increase in TBUT scores), there is also an associated improvement in tear production (reflected by an increase in Schirmer's Test scores). This finding supports the research (30) which identifies the positive correlation between the lipid layer thickness (LLT) and expressible meibomian glands.

On the other hand, among Group 2 clients who underwent the conventional warm compress method, no significant correlations were found between the gain/reduction scores of the measurement tools. The correlations between the ODSI reduction score and both the TBUT gain score and the Schirmer's Test gain score were non-significant, indicating a lack of relationship between improvements in OSDI scores and changes in tear film stability or tear production among Group 2 clients. These findings highlight the potential differential effects of warm compress application using different methods on the correlations between symptom improvement and objective measures of the tear film and tear production. This correlation study reinforces the perception that warm compress therapy can have a comprehensive impact on multiple aspects of tear film health. Further research and investigation are warranted to better understand these differences and their implications for the management of dry eye symptoms.

### 5.7 Association Between Dry Eye Syndrome and Demographic/Clinical Variables in Clients

The analysis of the association between the level of dry eye syndrome and selected demographic and clinical variables provides valuable insights into the potential factors that contribute to the development or severity of the condition. Several significant associations were found in Group 1, while no significant associations were observed in Group 2.

By examining the demographic variables, education level, and age showed highly significant associations with OSDI and TBUT post-test scores in Group 1. These findings are consistent with previous research indicating that age and educational status are important factors influencing dry eye symptoms. A cross-sectional study (19) found that age is an important risk factor for the prevalence of dry eye syndrome. Additionally, higher education could act as a moderating variable for screen usage and prolonged near-work activities, which are known to increase the risk of dry eye syndrome (17) and (31). However, the research (17) contradicted the association between education level and dry eye syndrome. The type of family also demonstrated a significant association with TBUT and Schirmer's Test post-test scores in Group 1. While this relationship may not have been extensively explored in the literature, it is possible that family dynamics and support systems could influence stress levels, lifestyle factors, or environmental conditions, which, in turn, may affect tear film stability and tear production. Furthermore, knowledge about dry eye syndrome showed significant associations with OSDI, TBUT, and Schirmer's Test post-test scores in Group 1. This finding suggests that a higher level of knowledge about the condition may relate to better outcomes. Educating clients about dry eye syndrome, its management, and preventive measures can empower clients to take appropriate actions and adopt healthy behaviours, which could positively impact their symptom severity and tear function. Regarding clinical variables in Group 1, height, weight, blood pressure, and the number of days since the onset of illness (dry eye) showed significant associations with the post-test results. These findings suggest that factors such as body stature, weight, blood pressure, and disease duration may influence dry eye symptoms and tear function. These findings provide support for the third hypothesis (H3), which posits that there is an association between the symptom complex and the selected demographic and clinical variables examined in this study.

By examining the association between dry eye syndrome and these variables, valuable insights can be gained regarding the potential factors that contribute to the development or severity of the condition. This information can be useful in understanding the underlying causes of dry eye syndrome and in tailoring appropriate management strategies for clients based on their specific demographic and clinical characteristics. However, the specific associations observed in this study may require further exploration and validation through additional research.

**5.8 Summary**

This chapter provides major findings and a discussion of results, which are organized into different sections and headings. Descriptive and inferential statistics were employed to analyze

the data in accordance with the study's objectives and hypotheses. Furthermore, the findings derived from these statistical analyses shed light on the relationships between the variables examined in this study and contribute to a deeper understanding of the research topic.

# CHAPTER VI

# SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATIONS, AND RECOMMENDATIONS

This chapter provides a concise summary of the research study, highlighting the implications and recommendations for further research directions. The implications of the study are discussed, considering how the results can inform healthcare professionals in managing dry eye syndrome. The chapter concludes by acknowledging the study's limitations and offering recommendations for future research studies, suggesting potential areas for further investigation to expand our understanding of this subject matter within the nursing field.

## 6.1 Summary of the Study

This research aimed to evaluate the effectiveness of warm compress application using optic care wear and conventional methods, compare the effectiveness between the methods, correlate the effectiveness with the symptom complex, and associate the level of dry eye syndrome with selected demographic and clinical variables.

The study involved screening the symptom complex of dry eye in Group 1 (70 elderly clients) and Group 2 (70 elderly clients). The effectiveness of warm compress application using optic care wear on the symptom complex was evaluated in Group 1, while the effectiveness of warm compress application using the conventional method was evaluated in Group 2. The findings showed that warm compress application using optic care wear in Group 1 led to significant reductions in OSDI scores, improvements in tear film stability (TBUT scores), and enhancements in tear production (Schirmer's Test scores). Conversely, warm compress application using the conventional method in Group 2 resulted in minimal improvements in the symptom complex, with no significant differences in OSDI, TBUT, and Schirmer's Test scores.

Comparing the two groups, the study demonstrated the superior effectiveness of warm compress application using optic care wear in Group 1 compared to the conventional method in Group 2. Additionally, a correlation analysis revealed a relationship between warm compress application methods (optic care wear versus conventional) and the symptom complex among

the two groups. Furthermore, the research explored the association between the level of dry eye syndrome and selected demographic and clinical variables. The findings indicated significant associations between demographic variables (such as age, education, family type, and knowledge about DES) and clinical variables (such as height, weight, blood pressure, and the number of days since the onset of the illness of dry eye) with the symptom complex, highlighting their potential impact on the severity of dry eye symptoms.

### 6.2 Conclusion

In conclusion, this research provides valuable insights into the effectiveness of warm compress application using different methods in managing the symptom complex of dry eye among the elderly. The study findings led to the following conclusions being drawn.

- The study demonstrated a significant improvement in elderly clients with dry eye syndrome who received warm compress using optic care wear compared to those who received the conventional method. This highlights the effectiveness of warm compress with optic care wear in reducing the level of dry eye symptoms in this population.
- The feasibility and practicality of the data collection tool utilized in the study allowed for a reliable assessment of dry eye symptoms in elderly clients. This enhances the credibility of the findings and supports the use of similar assessment tools in future research and clinical practice.
- Optic care wear was identified as a viable and effective intervention tool for managing dry eye syndrome in the elderly population.
- The findings of this study contribute to the growing body of evidence supporting the use of warm compress with optic care wear as a potential therapeutic approach for managing dry eye syndrome in elderly clients.

### 6.3 Implication

The study has several implications for nursing practice and nursing research.

- **Nursing Practice:** *This study has implications for nursing practice as it suggests that incorporating warm compress interventions with optic care wear can be a valuable approach to managing dry eye syndrome.*
- **Nursing Education:** *The study underscores the importance of patient education in enhancing knowledge about dry eye syndrome, enabling nurses to educate clients about the benefits of warm compress application with optic care wear. This empowers clients to actively participate in their care and improve their eye health.*

- **Nursing Research:** *This study adds to nursing research by providing evidence on the effectiveness of warm compress interventions for managing dry eye symptoms, and it suggests potential directions for future research such as long-term effects, cost-effectiveness, and comparative efficacy with other treatments. Further studies can explore the underlying mechanisms of action and expand the knowledge base in different populations and settings.*
- **Nursing Administration:** *The study findings can inform quality improvement initiatives in healthcare settings. By implementing warm compress interventions using optic care wear as a standard practice, healthcare facilities can improve the management of dry eye syndrome in elderly patients. This can lead to better patient outcomes, enhanced patient satisfaction, and reduced healthcare costs associated with dry eye management.*

Overall, the implications of this study on nursing practice and nursing research underscore the importance of evidence-based interventions, patient education, and quality improvement initiatives in the management of dry eye syndrome among elderly clients.

### 6.4 Limitations and Challenges

Limitations and challenges of the study include the difficulty in obtaining consent from older clients for participation, which may have impacted the generalizability of the findings. The daily intervention requiring twice-daily application posed practical difficulties for the elderly population, potentially affecting adherence to the intervention. Additionally, the three-week duration of the interventions presented challenges in terms of implementation and participant compliance. Furthermore, the absence of repeated measures throughout the intervention period limited the opportunity for in-depth analysis and assessment of the long-term effects of the interventions. The study focused specifically on elderly clients, so the results may not be applicable to younger age groups. Moreover, the study was conducted within a specific geographical area or healthcare setting, which may limit the generalizability of the findings to other regions or settings with different demographics or healthcare practices.

### 6.5 Recommendations

Based on the findings of this study, there are three major recommendations for future expansion of this research:

- **Conduct larger-scale studies:** *To enhance the generalizability of the findings, future studies should aim to include a larger and more diverse sample size, encompassing a wider range of age groups and geographic locations.*

- **Long-term follow-up:** *To assess the sustained effects of the intervention, it is essential to conduct long-term follow-up studies that extend beyond the three-week intervention period.*
- **Comparative effectiveness research:** *Comparative studies comparing warm compress interventions using optic care wear with other treatment modalities for dry eye syndrome would be valuable. This research would help identify the most effective interventions for different patient populations and provide insights into the comparative benefits, risks, and costs associated with different management approaches.*

By pursuing these recommendations, future research can build upon the current study's findings, further advancing our understanding of the role of warm compress interventions using optic care wear in managing dry eye syndrome and its implications for clinical practice.

### 6.6 Summary

This chapter provides a concise overview of the research study, including a summary of the findings, conclusions drawn from the study, implications of the research in various nursing fields, strengths of the study, limitations encountered during the research process, and recommendations for future studies.

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# APPENDICES

**Description of the Tool**

Part –I: Demographic variables Sample Number:

Instructions:

Read the questions carefully. Pick out the best answer and put a tick mark in the appropriate box.

1) Age
    a) 60 -70 years
    b) 71 years – 80 yrs
    c) Above 80 years
2) Sex
    a) Male
    b) Female
3) Education (Modified Kuppuswamy scale updated for the year 2020)
    a) Illiterate
    b) Primary school education ($1^{st}$ - $5^{th}$)
    c) Middle school education ($6^{th}$ -$9^{th}$)
    d) High education ($10^{th}$), IT1
    e) Higher secondary education ($11^{th}$ -$12^{th}$)
    f) Collegiate
4) Socioeconomic status- Revision of Prasad's social classification for the year 2020 Social Class Per capita monthly income limits Social Class Revised for 2020 (in Rs./month)
    a) Upper class (Rupees 7533 and above)
    b) Upper middle class (Rupees 3766-7532)
    c) Middle class (Rupees 2260-3765)
    d) Lower middle class (Rupees 1130-2259)
    e) Lower class (Rupees 1129 and below)
5) Type of family
    a) Nuclear
    b) Joint
    c) Extended

6) Religion
    a) Hindu
    b) Muslim
    c) Christian
    d) Others
7) Area of residence
    a) Rural
    b) Urban
8) Personal Habits
    a) Smoking
    b) Alcohol
    c) Pan masala
    d) Others
9) Leisure time activity
    a) Television
    b) Friends
    c) Family members
    d) Playing games and watching the movie in mobile/tab/laptop
    e) Spending time in social media
    f) Listening to music
    g) Reading books
    h) Gardening
    i) Others _____
10) Do you use Gadgets
    a) Yes
    b) No

    If yes, what type of gadgets are you using
    a) Computer
    b) Smart Phone
    c) Television
    d) All the above
11) How long do you use the Gadgets per day?
    a) Less than 1 hour
    b) 1 – 3 hours

c) 3 – 6 hours

d) More than 6 hrs

12) Are you using any contact lens

a) Yes

b) No

13) Knowledge about dry eye syndrome

a) Yes

b) No

14) Source of information on dry eye syndrome

a) Doctors

b) Nurses

c) Health workers (ANM, Multipurpose worker, ASHA worker)

d) Internet

PART – II Clinical Variables

1) Height in cm
2) Weight in kg
3) Body mass index- Asian criteria-based BMI
    a) Underweight (<18.5)
    b) Normal (18.5 - 22.9)
    c) Overweight (23.0 - 27.5)
    d) Obese (>27.5)
4) Temperature in Fahrenheit
5) Pulse in beats /min
6) Respirations breaths / min
7) Blood pressure in mmHg
8) Previous history of hospitalization on dry eye syndrome
    a) Yes
    b) No
9) Onset of illness (Dry eye) - number of days
10) What measures have you taken to relieve dry eye syndrome
    a) Warm compression
    b) Cold compression
    c) Allopathy treatment
    d) Artificial tears
    e) others

11) Are you having any of the following condition?

a) Diabetes mellitus

b) Hypertension

c) Thyroid disorder

d) Vitamin A disorder

e) Others

f) Nil

## OCULAR Surface Disease Index (OSDI)

### Ocular Surface Disease Index© (OSDI©)[2]

Ask your patient the following 12 questions, and circle the number in the box that best represents each answer. Then, fill in boxes A, B, C, D, and E according to the instructions beside each.

**HAVE YOU EXPERIENCED ANY OF THE FOLLOWING *DURING THE LAST WEEK*:**

| | All of the time | Most of the time | Half of the time | Some of the time | None of the time |
|---|---|---|---|---|---|
| 1. Eyes that are sensitive to light? | 4 | 3 | 2 | 1 | 0 |
| 2. Eyes that feel gritty? | 4 | 3 | 2 | 1 | 0 |
| 3. Painful or sore eyes? | 4 | 3 | 2 | 1 | 0 |
| 4. Blurred vision? | 4 | 3 | 2 | 1 | 0 |
| 5. Poor vision? | 4 | 3 | 2 | 1 | 0 |

Subtotal score for answers 1 to 5 (A)

**HAVE PROBLEMS WITH YOUR EYES LIMITED YOU IN PERFORMING ANY OF THE FOLLOWING *DURING THE LAST WEEK*:**

| | All of the time | Most of the time | Half of the time | Some of the time | None of the time | |
|---|---|---|---|---|---|---|
| 6. Reading? | 4 | 3 | 2 | 1 | 0 | N/A |
| 7. Driving at night? | 4 | 3 | 2 | 1 | 0 | N/A |
| 8. Working with a computer or bank machine (ATM)? | 4 | 3 | 2 | 1 | 0 | N/A |
| 9. Watching TV? | 4 | 3 | 2 | 1 | 0 | N/A |

Subtotal score for answers 6 to 9 (B)

**HAVE YOUR EYES FELT UNCOMFORTABLE IN ANY OF THE FOLLOWING SITUATIONS *DURING THE LAST WEEK*:**

| | All of the time | Most of the time | Half of the time | Some of the time | None of the time | |
|---|---|---|---|---|---|---|
| 10. Windy conditions? | 4 | 3 | 2 | 1 | 0 | N/A |
| 11. Places or areas with low humidity (very dry)? | 4 | 3 | 2 | 1 | 0 | N/A |
| 12. Areas that are air conditioned? | 4 | 3 | 2 | 1 | 0 | N/A |

Subtotal score for answers 10 to 12 (C)

ADD SUBTOTALS A, B, AND C TO OBTAIN D (D = SUM OF SCORES FOR ALL QUESTIONS ANSWERED) (D)

TOTAL NUMBER OF QUESTIONS ANSWERED (DO NOT INCLUDE QUESTIONS ANSWERED N/A) (E)

Please turn over the questionnaire to calculate the patient's final OSDI© score.

**OSDI Score Interpretation**

| | |
|---|---|
| 0 - 12 | Normal |
| 13 - 22 | Mild |
| 23 - 32 | Moderate |
| > 33 | Severe |

**TBUT – Tear Break up test**

A standard fluorescein stripe was moistened and used to lightly touch the inferior palpebral conjunctiva. The patient would be asked to blink several times. Under the cobalt blue light, the time interval between the last blink and the appearance of the first desiccation spot would be recorded as TBUT.

| | |
|---|---|
| >10 seconds | Normal |
| 5 to 10 seconds | Marginal |
| < 5 seconds is considered | Low |

**Schirmer's Test.**

Schirmer's test determines whether the eye produces enough tears to keep it moist 0.5mm measured folded tear strip is kept under the lower eyelids mid-way between the middle and outer canthus of the eyelid for 5 min to measure the wetness of the strip to assess tear level.

| **Dry Eye Category** | **Tear Level** |
|---|---|
| Normal | > 10 mm |
| Mild Dry Eye | 7 – 9 mm |
| Moderate Dry Eye | 5 – 7 mm |
| Severe Dry Eye | < 5 mm |

# Suggestions and Comments

**Thank you for your Valuable comments and Feedback!**